A PICTORIAL SURVEY OF CURRENT PRACTICE, EQUIPMENT AND MATERIALS

Construction Methods

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TECHNOLOGY DEPT.

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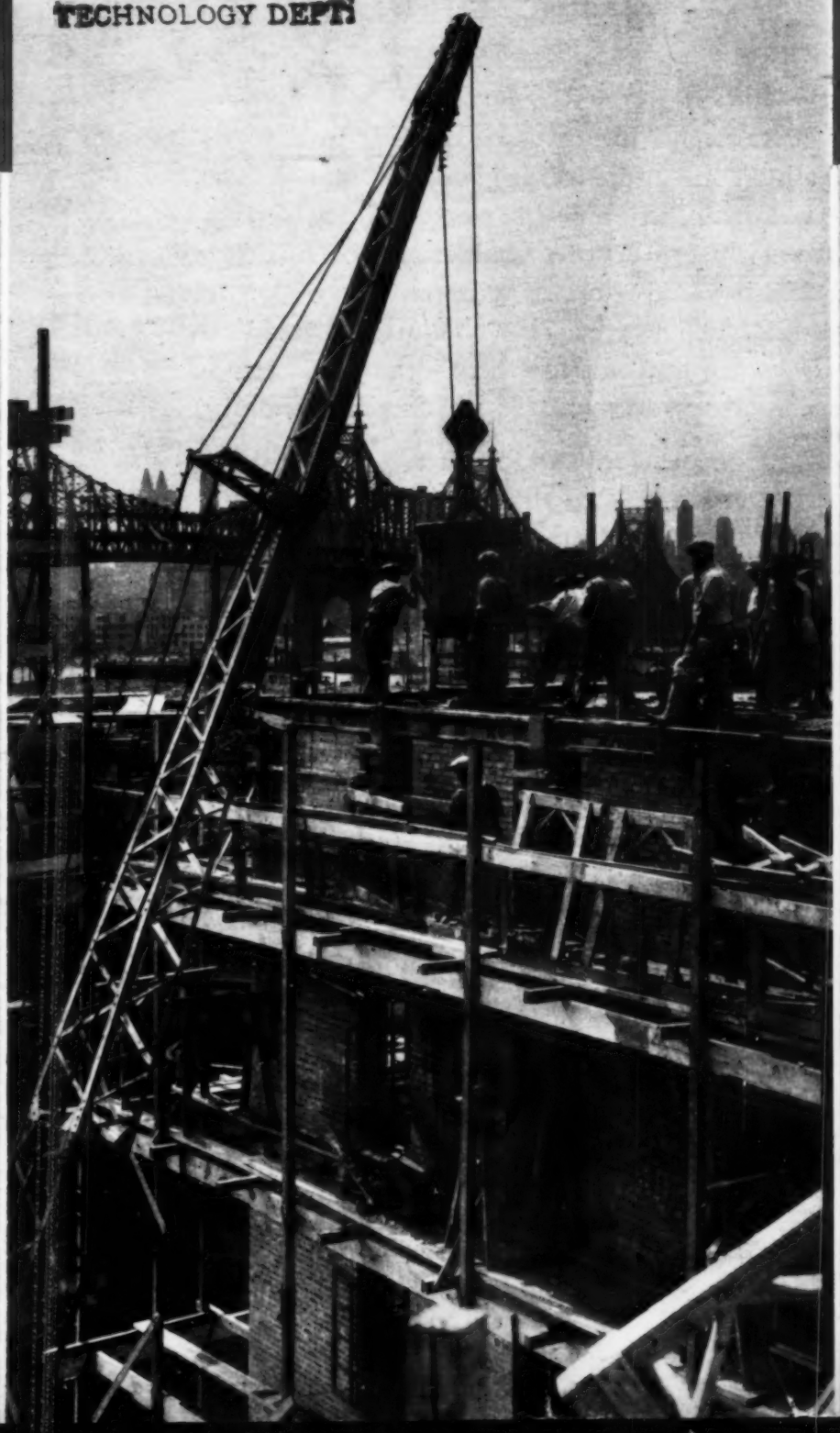

MASS HOUSING—On $15,000,000 Queensbridge project, New York City, long-boom cranes place concrete and hoist steel for group of 26 six-story apartment buildings.

ELECTRIC POWER ON CONSTRUCTION — Operating details of dredges which are placing 26,000,000 cu.yd. of hydraulic fill in Kingsley dam on North Platte River in Nebraska. Main 30-in. dredge pumps are driven by 4,000-hp. electric motors.

SMALL TOOLS ON CONSTRUCTION — A new monthly department illustrating the wide range of applications of hand and light power tools on contract work.

AIRPORT CONSTRUCTION — New bituminous processed base was built to support thin top course for runways at Akron, Ohio. — By M. D. WILSON, assistant city engineer.

BRIDGE PIERS IN DEEP WATER — Unusual difficulties overcome in sinking caissons for substructure of Tacoma Narrows bridge through swift tidal current where channel bed is 140 ft. below surface.

NEXT MONTH — Annual Road Builders' Number

DECEMBER 1939

REACHING TO SIX-STORY HEIGHT *crawler crane with 85-ft. boom delivers concrete to group of 26 buildings forming Queensbridge housing project in New York City.*

3 NEW 1¾-YD. LORAIN-80's Make 43 LORAINS

FOR GEO. M. BREWSTER & SON, INC., BOGOTA, N. J.

● 43 Lorains purchased over a period of 9 years! So what? Just this—Geo. M. Brewster & Son, Inc. bought their first Lorain in 1930. Its performance was so convincing, they have since chosen Lorain equipment for handling millions of yards of dirt and rock—and at present have Lorains on contracts totaling over 12,000,000 yds. The 43 Lorains used by them represent practically every unit in the line—shovels, cranes, draglines and backdiggers, ranging from ¾ to 2-yd. capacity.

In other words, these successful contractors have found it to their advantage to play Lorains straight across the board regardless of type or size. And you'll find them a sure bet, too, because all Lorains are built to Center Drive design—a time-proven feature that makes for greater simplicity, added power, speed and strength—hence, greater profits.

Write for catalogs describing ⅜ to 2½-yd. Lorains

THE THEW SHOVEL CO. • LORAIN, OHIO

NEW JERSEY

—1½-yd. Diesel Lorain-79 dragline averages 1200 yds. per 8 hrs. on this 100,000 yd. reservoir contract of Geo. M. Brewster & Son, Inc.

NEW YORK

—¾-yd. Lorain-40A backdigger of Geo. M. Brewster & Son, Inc. digs drains, ditches; handles small jobs on the New York Acqueduct near Lackawack, N. Y.

MASSACHUSETTS

—This new 1¾-yd. Lorain-80 is one of two Lorains being used by Geo. M. Brewster & Son, Inc. on the 1,000,000 yd. Knightville Dam near Huntington, Mass.

PENNSYLVANIA

Geo. M. Brewster & Son, Inc. uses these two 2-yd. Lorain-87's to dig 650,000 yds. of solid rock for a spillway on the Crooked Creek (Pa.) Dam. Brewster has a total of 5 Lorains on this job which totals 3,000,000 yds.

SEE THESE MODERN MACHINES and METHODS AT THE CHICAGO ROAD SHOW JAN. 29–FEB. 2

THEW CENTER DRIVE

CURRENT JOBS

.... and Who's Doing Them

BUILDINGS

Public—New criminal courts building in New York City, costing $8,992,000 will be constructed by **Cauldwell-Wingate Co.**, of New York City. In Los Angeles, Calif., low bidder on Ramona housing project was **C. L. Peck**, local contractor, with tender of $1,149,000. For the Tasher Street housing project in Philadelphia, contract for $2,686,000 was awarded to **Turner Construction Co.**, of New York City. At a price of $3,616,700 to Harrison housing in Peoria, Ill., went to **Patrick Warren Construction Co.**, of Chicago. Low bidder for housing project in Boston, Mass., was **John Bowen Co.**, of Boston, with price of $2,331,000. At cost of $1,911,175, housing project in Lowell, Mass., will be built by **M. S. Kelliher Co.**, of Boston. For the Navy Department in Washington, D. C., central office building will be constructed by **John McShain, Inc.**, of Baltimore, for $1,356,000. Another Boston (Mass.) housing project was awarded to **C. J. Maney, Co., Inc.**, local contractor, for $1,073,000. In Columbus, Ga., successful bidder for the Peabody housing project was **Virginia Engineering Co.**, of Newport News, Va., with price of $913,000. A $689,455 housing project in Columbia, S. C. went to **V. P. Loftis**, of Charlotte, N. C. Piedmont Courts, comprising 29 houses in Charlotte, N. C., drew low bid of $537,000 from **Charles W. Angle, Inc.**, of Greensboro, N. C. **Maxon Construction Co.**, of Dayton, Ohio, will build in that city for $555,497 a reinforced concrete building for the Army at Wright Field. Superstructure contract for Vladeck houses in New York City, was awarded to **George A. Fuller Co.**, of New York, for $4,625,000. Kings County hospital in Brooklyn, N. Y., will be built for $1,193,500 by **Tobias Heller & Co.**, of New York City. A 21-story hospital-nurses' home in Jersey City, N. J., costing $1,348,000 will be constructed by **Censullo Burke Construction Co.**, of Union City, N. J.

Industrial—Laboratory building for Bell Telephone organization costing $3,000,000 will be constructed in Murray Hill, N. J., by **John Lowry, Inc.**, of New York City. A $1,500,000 contract for General Electric Co. warehouse in Chicago, Ill., was awarded to **James Stewart Corp.**, of Chicago. Airplane factory in Paterson, N. J., costing $1,000,000 went to **Mahoney-Troast Co.**, of Passaic, N.J. In South Boston, Va., **C. M. Guest & Sons**, of Anderson, S. C., will build a $1,000,000 textile plant building. At cost of $800,000 **Muirhead Construction Co.**, of Durham, N. C., will build a paper mill structure in Plymouth, N. C. **White Construction Co.**, of New York, received $800,000 contract for an industrial plant building in New Brunswick, N. J. **Dyker Building Corp.**, of New York City, is erecting a $765,000 factory in Stamford, Conn.

HEAVY CONSTRUCTION

An air base at San Juan, P. R., costing $8,330,000 will be built by **Arundel Corp.**, and **Consolidated Engineering Co., Inc.**, of Baltimore. **Macco Construction Co & Case Construction Co., Inc.**, of Clearwater, Calif., will build a navy graving dock at Bremerton, Wash. For railroad relocation at Los Animas, Colo., low bidder was **Western Contracting Corp.**, of Sioux City, Ia., with price of $1,058,688. Water filtration plant in Chicago, Ill., costing $6,616,650 will be built by **Michael Pontarelli & Son**, local contractor. In Laverne, Calif., $1,632,992 contract for water softening plant went to **Griffith Co., Weymouth-Crowell Co.**, of Los Angeles. At Redding, Calif., **Union Paving Co.**, of San Francisco, will build $1,138,228 bridge over Pit River. **American Bridge Co.**, of New York City, received $1,099,505 contract for bridge across Passaic River, N. J. In Hyattsville, Md., **Charles H. Tompkins Co.**, of Washington, D. C. will construct $678,889 sewage treatment works. Recent dredging contracts included the following: $1,153,000 in New York and New Jersey, to **Great Lakes Dredge & Dock Co.**, of New York City. $503,391 in Columbia River, Washington, to **General Construction Co.**, of Seattle; $436,968 in Thames River, Conn., to **Trimount Dredging Corp.**, of Boston. $751,000 in Florida to **Arundel Corp.**, of Baltimore.

HIGHWAYS

Among recent highway contract awards are the following: Florida: $904,944 to **Arundel Corp.**, of Baltimore. New York: $418,284 to **Collins Bros.**, of Mechanicville, N. Y. Alabama: $222,201 to **Hardaway Contracting Co.**, of Columbus, Ga. Pennsylvania: $616,620 to **Tri-State Engineering Co., of** Washington, Pa.; $583,430 to **Mid-Western Construction & Asphalt Co.**, of Chicago; $311,142 to **Harrison Construction Co.**, of Pittsburgh. California: $337,625 to **Healey-Moore & Frederickson & Watson**, of Oakland, Calif. Oregon: $116,065 to **R. L. Houck**, of Salem, Ore.; $103,662 to **Rogers Construction Co.**, of Dayton, Washington; $165,025 to **G. D. Lyon & Co.**, Spokane, Wash. New Mexico: $217,932 to **A. O. Peabody**, of Santa Fe; $237,572 to **Henry Thygesen & Co.**, of Albuquerque. Nebraska: $232,632 to **Paxton & Vierling Iron Works**, of Omaha.

DECEMBER, 1939

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Construction Methods

A Pictorial Survey of Current Practice, Equipment and Materials

Robert K. Tomlin, Editor — Editorial Staff: Vincent R. Smith, Paul Watson (Washington), Hollis Fitzgerald
A. E. Parton, Manager

Established in 1919
A McGRAW-HILL PUBLICATION

The HOW of it

How **WELDED WELL CASING** was sunk to record depth of 8,100 ft. — p. 29

How **ELECTRIC POWER** drove dredge pumps on hydraulic fill dam. — p. 32

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How **CUTTER SHAFT ON DREDGE** was driven through inclosed reduction gear with flexible coupling. — p. 35

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How **AIRPORT RUNWAYS** were built on bituminous-processed base. — p. 58

CONSTRUCTION METHODS. December, 1939. Volume 21. Number 12. Published Monthly, price 20¢ a copy. Subscription rates — United States, Canada, Mexico and Central and South American countries, $1.00 a year; three years for $2.00. All other countries, $2.00 a year or 10 shillings. Entered (or reentered) as second class matter December 16, 1936 at the Post Office at New York, N.Y., U.S.A., under the act of March 3rd, 1879. Printed in U.S.A. Cable address: "McGrawhill, New York." Member of A.B.P. Member of A.B.C. Contents Copyrighted 1939 by McGraw-Hill Publishing Co., Inc., 330 West 42nd Street, New York, N. Y.

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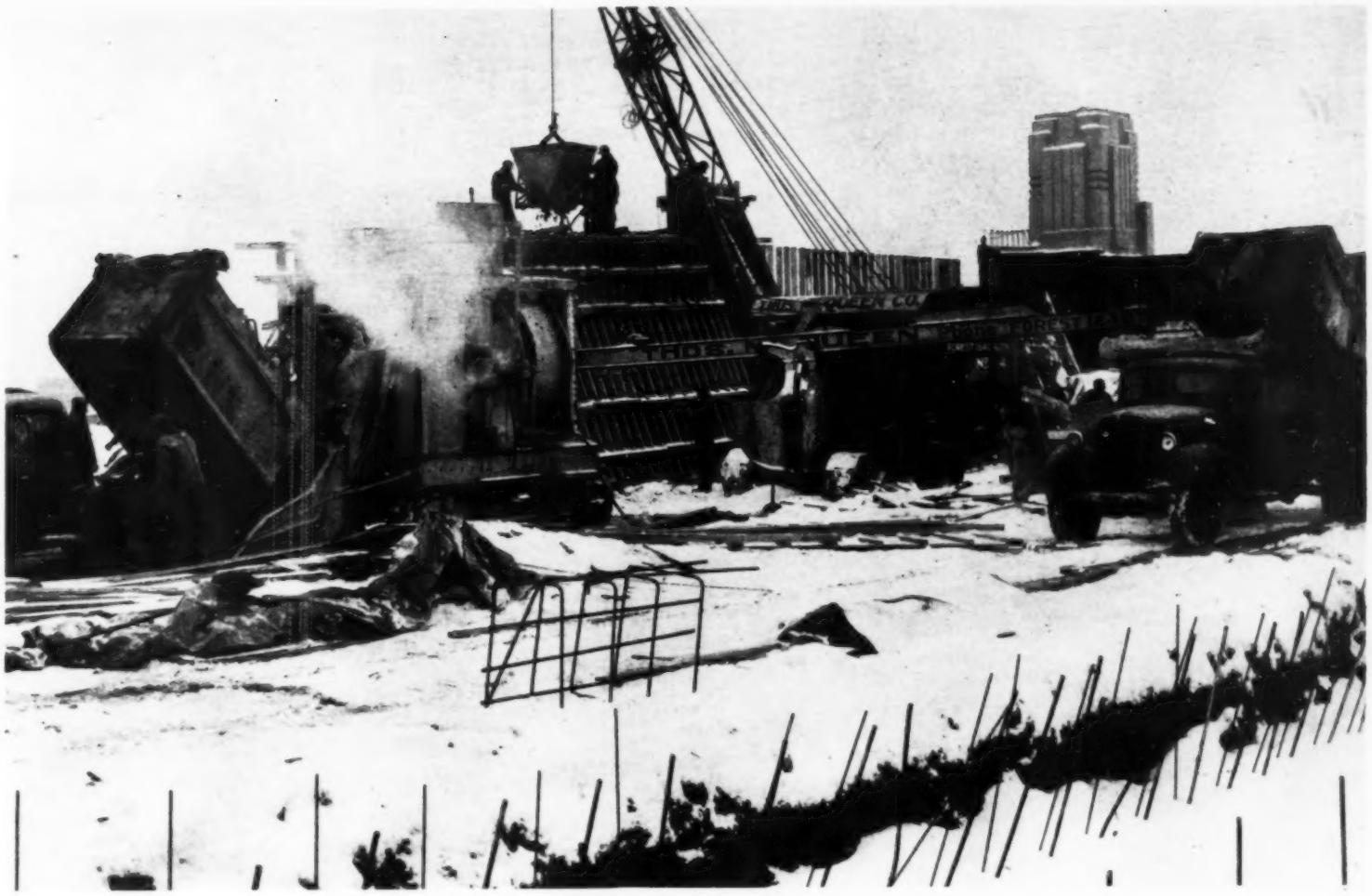
THE JOB JESTER

CARTOONS DRAWN FOR CONSTRUCTION METHODS

"Back just a bit, Boss—I want to get you all in!"

"He sez th' hod blisters his hands, so th' Boss lets him carry 'em his own way!!"



Chicago Cuts Winter Costs

'INCOR' USED FOR LARAMIE AVE. VIADUCT APPROACH

TAKEN in a driving snowstorm, picture (above) suggests cold-weather conditions under which the south approach of the new Laramie Avenue Viaduct was concreted last Winter. City of Chicago specified high early strength cement. Thomas McQueen Company, of Forest Park, Ill., Contractor, used 'Incor' 24-Hour Cement. Result: Service strength in one-fifth the usual time — with a corresponding saving in heat-protection costs.

It pays to remember that the quicker concrete hardens the less time and expense are required to provide costly heat-protection. 'Incor' 24-Hour Cement saves real money on cold-weather work because it gains strength faster and the concrete is safe from freezing sooner. Heat mixing water and aggregates; to avoid heat loss, protect the concrete promptly after placing; then, with 'Incor', provide heat-protection for 24 hours after concrete is placed. When temperatures are below 20°, provide protection for 48 to 72 hours. 'Incor'* saves, at very least, two days' heat-curing on each pour.

To fuel and labor savings, add reduced form costs and lower job overhead as well. Figure these savings on work now in progress; you'll be money ahead if you do. Write for copy of "Cold-Weather Concreting." Lone Star Cement Corporation, Room 2266, 342 Madison Avenue, New York.

*Reg. U. S. Pat. Off.

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A few facts about shovels PROVE

BIGGER VALUE at LOWER COST

when you buy a BAY CITY

By every count the BAY CITY offers you biggest shovel, crane, dragline or trench hoe value—a glance at the chart proves this beyond doubt with better weights, wider working ranges and safer crane loads plus greater power. But this is only part of the story! All BAY CITY Shovels are fully convertible *without machinery change* • have powerful one piece chain crowd with electric dipper trip • are standard equipped with "E-Z" control power operated clutches • use unit-cast alloy steel bases. Here is big value at low cost.

That, too, is only part of the story for you should not be confused with low purchase price. The real cost is measured by combining purchase price with maintenance and operating costs. BAY CITY outstanding performance will pay big dividends in your excavating and material handling. For complete information write for Catalog H-2 containing 32-pages of photos and data.

a few FACTS

about 3/4 yard

Shovels - Cranes - Draglines

	BAY CITY Model 42	BAY CITY Model 45	Average* ¾ Yard
Weight	42,000	44,400	36,915
Boom Length	18'0"	19'0"	17'9"
Dipper Sticks	13'0"	14'3"	13'11"
SHOVEL			
Dump Height	15'2"	16'10"	14'10"
Dump Radius	23'3"	24'2"	22'3"
Dig Radius	26'6"	27'11"	25'11"
CRANE SAFE LOADS			
12' Radius	17,000	20,000	15,715
20' Radius	8,350	9,700	7,770
30' Radius	4,700	5,700	4,490
Crawler Length	12'0"	12'6"	10'11"
Piston Displace.	517	520	443

*Based on available data from 10 other mfrs. of ¾ yd. jobs.

By every dipper-full and every count the BAY CITY offers you the biggest value.

Martello & Sons, Toronto contractors, said "A BAY CITY for Mine in '39" switching from another make and are highly pleased with the outstanding performance of this "Caterpillar" Diesel job. BAY CITY performance plus low cost maintenance and operation has resulted in constant increase in sales. 1937 *was* the biggest year in the history of our company. Then 1938 took the lead *and now* 1939 sales already exceed all previous years. Put yourself in line for bigger P-R-O-F-I-T-S in 1940 with a BAY CITY.

A BAY CITY FOR MINE IN '39

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12 Sizes
⅜ to 1¼ Yard
Also truck mounted shovels and cranes

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BAY CITY SHOVELS

AGAIN STAMINA AND SPEED

Put EUCLIDS Out in Front!

Here is a Comparative "Cycle-Time" Record at Ground Hog Dam That Shows EUCLID ECONOMY:

Type of Equipment	No. of Buckets	Loading Time	To Dam	On Fill	Return	Total Cycle Time
Euclid 12-Yd. Model F.D.T.	6	2 Min.	2.5 Min.	.5 Min.	2.5 Min.	7.5 Min.
Euclid 8-Yd. Model 1Z.	4	1.5 Min.	3 Min.	.5 Min.	3 Min.	8 Min.
Conventional 6-Yd. Dump Trucks	3	1 Min.	4 Min.	3.5 Min.	4 Min.	12.5 Min.

EVERY day's a "field day" for Euclids! The above comparative cycle time data, taken on Ground Hog Dam, Denver, Colorado, shows how they "top the field"—speeding operations to cut better than one third off hauling costs compared with competitive equipment. On this job, Knutson and Burns use two 12-yard and two 8-yard Euclid Bottom-Dump units along with conventional 6-yard dump trucks. Hauling is done from borrow pits .6 mile one way. The haul road is only fair, averages level, ending with an 8% ramp 400 feet long onto the dam. Why not turn Euclid's time-saving potential to your advantage? Here's performance that covers ground faster to haul your profits higher!

Above is a close-up loading view of a Euclid 12-yard Bottom-Dump unit. To the right is a general view of the dam site from the west. The large photo at the top shows the haul road approach to the fill.

THE EUCLID ROAD MACHINERY CO.
CLEVELAND, OHIO U. S. A.
BRANCH OFFICE 185 EAST BUTLER AVENUE MEMPHIS TENN

WHERE ORDINARY GREASE *Won't do . . .*

Left—**SHOVELS, DRAGLINES, TRACTORS** present lubrication problems that Texaco Marfak will take care of properly. Marfak seals bearings against the effect of rain and mud, and the abrasive action of sand and grit.

Right—**TRUCK OPERATORS** get double service from Texaco Marfak for chassis lubrication. It protects parts twice as long. Doesn't separate or wash away.

MANY operators of heavy equipment know that it pays to service many important grease-lubricated bearings with Texaco Marfak.

Unlike buttery types of lubricants, Texaco Marfak is tough, adhesive, cohesive. It doesn't channel or squeeze out, but clings to bearing surfaces despite heavy pressures.

Texaco Marfak liquefies in the bearing, and retains its consistency at the ends, sealing in the lubricant and excluding dirt and water.

Experienced lubrication engineers, trained in the selection and application of Texaco Industrial Lubricants, will be glad to demonstrate that savings can be made with Texaco Perfected Lubrication. For prompt engineering service and deliveries, phone the nearest of our 2279 warehouses in the U. S., or write:

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TEXACO

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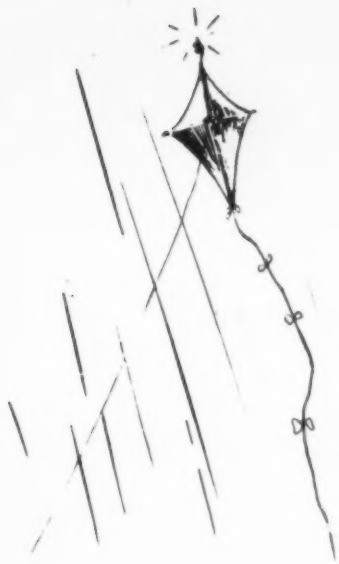
RESEARCH



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That is why there is always a "HERCULES" (Red-Strand) Wire Rope to meet the new requirements of progressing industry. That is why "HERCULES" (Red-Strand) is always able to give you top-flight performance even on the toughest jobs.

Use "HERCULES" (Red-Strand) on your next job. It is made of acid open-hearth steel wire, correctly designed, and manufactured according to advanced methods — to give you long, safe and economical performance.

STRENGTH
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TOUGHNESS
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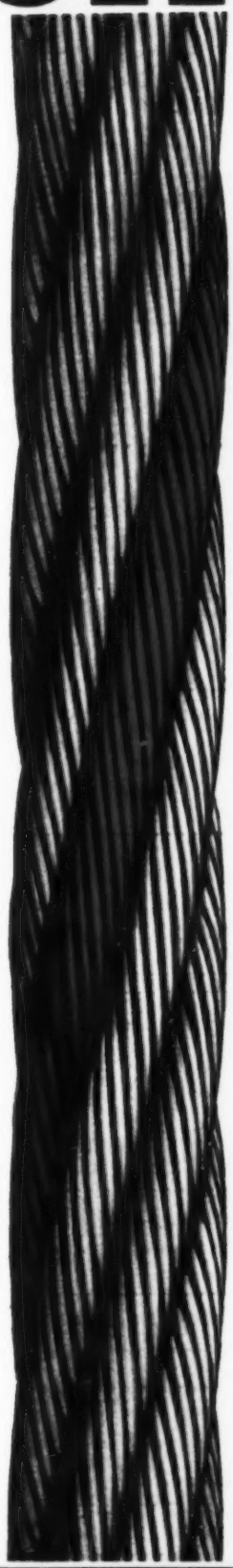

Benjamin Franklin's research in electro-physics, chemistry, medicine, meteorology and geology led him to new discoveries which greatly advanced civilization.

In order to be suitable for all purposes, "HERCULES" (Red-Strand) Wire Rope is made in a wide range of both Round Strand and Flattened Strand constructions — all of which are available in either the Standard or Preformed type. We would be glad to help you select the right rope for your particular equipment and conditions. Why not write us for a recommendation?

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weighs 150,000 tons *less* after this blast with

ATLAS EXPLOSIVES!

Los Cerrillos, N. M., June 2—A huge slice of the 200-foot high diorite-rock hill called "Devil's Throne" today became available for track ballast for the Santa Fe Lines.

The blast, using over 28,000 pounds of explosives, took place between the Santa Fe's main line tracks and an adjacent highway. The explosive force was so well controlled that no rocks went on the tracks or highway. As a result of the blast, which was engineered by the Sharp and Fellows Contracting Co., assisted by Atlas Technical Service, the Santa Fe Lines acquired 150,000 tons of 2-inch ballast.

Officials of both the contracting company and the railroad expressed satisfaction with this economical and efficient use of controlled force.

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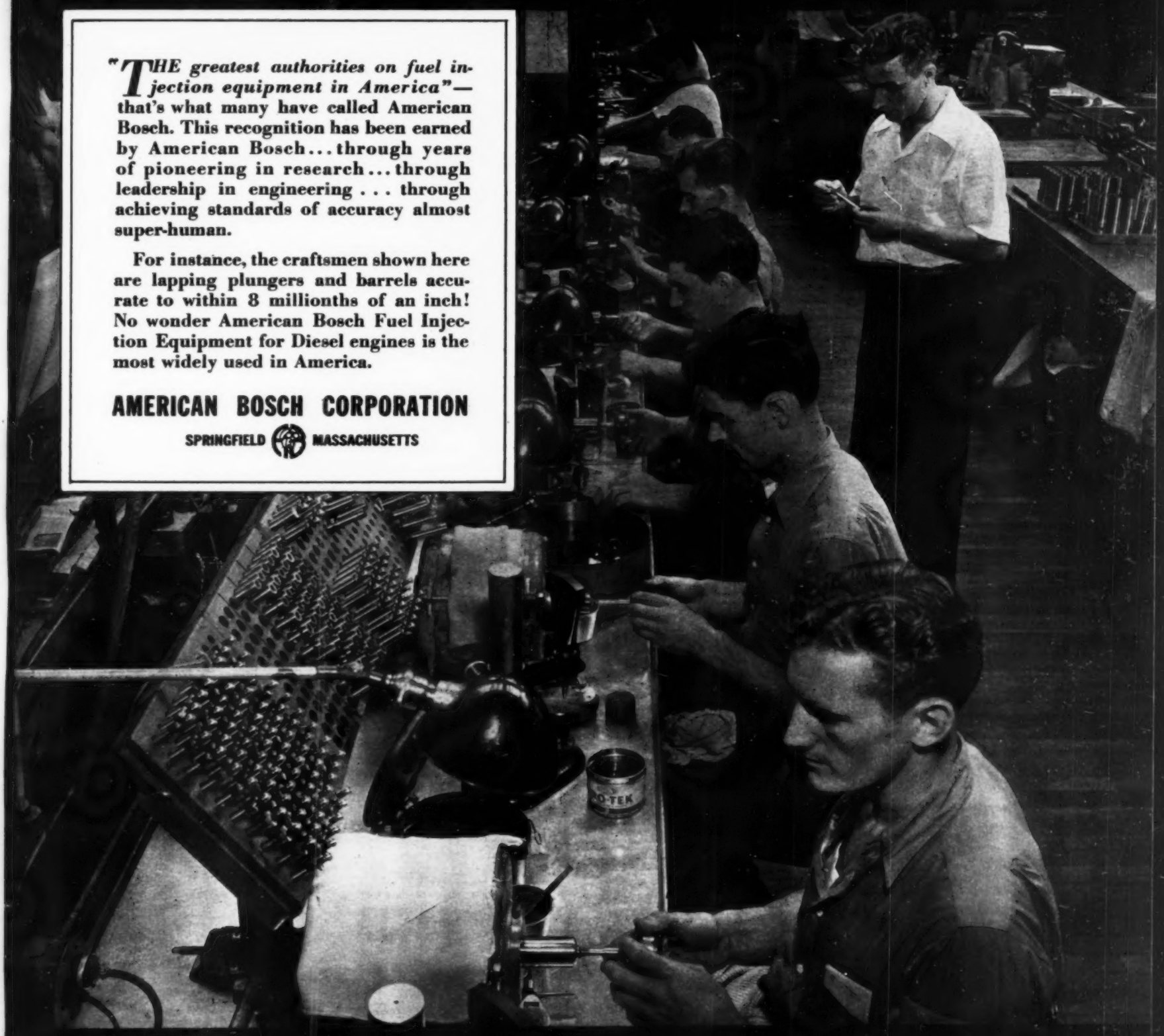
8 Millionths of an Inch!



"THE greatest authorities on fuel injection equipment in America"— that's what many have called American Bosch. This recognition has been earned by American Bosch... through years of pioneering in research... through leadership in engineering ... through achieving standards of accuracy almost super-human.

For instance, the craftsmen shown here are lapping plungers and barrels accurate to within 8 millionths of an inch! No wonder American Bosch Fuel Injection Equipment for Diesel engines is the most widely used in America.

AMERICAN BOSCH CORPORATION

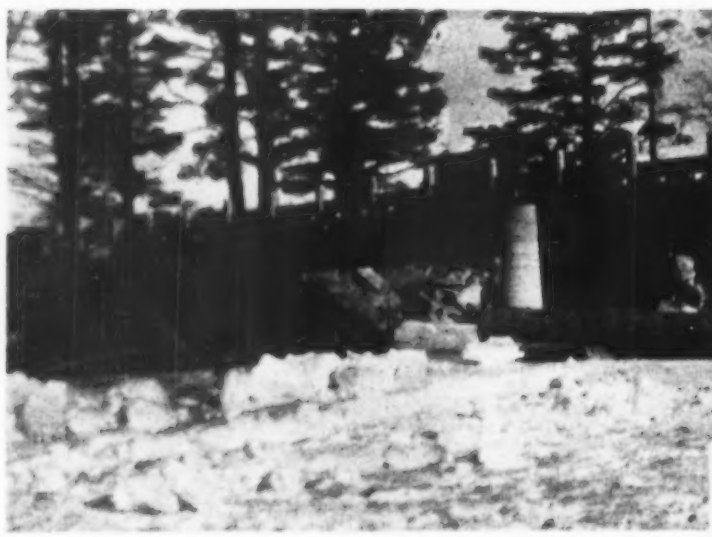
SPRINGFIELD MASSACHUSETTS

AMERICAN BOSCH

Fuel Injection STANDARD OF AMERICA WORLD WIDE SERVICE *Equipment*

No contractor chooses zero weather

as the ideal time to place concrete. But given a job that *must* be done, Lehigh Early Strength Cement provides a safety factor. At any temperature it cures three to five times faster than normal cement used under the same conditions. Heat protection time, cost and fire hazard are correspondingly reduced. Because of quick re-use of forms, their cost is lower. Quicker completion means lower overhead—better all-around economy.



VILLAGE BRIDGE
HANCOCK BRIDGE
Erected at Irasburg, Vt., for the Vermont State Bridge Department, A. D. Bishop, Engineer, by Ryan & Densmore, Contractors, Claremont, N. H.

LEHIGH
EARLY STRENGTH
CEMENT

Hurricane destruction and below zero temperatures were not expected when these bridges were started last fall. After the hurricane wiped out the temporary bridges, speedy construction and quick use of the new concrete floor slabs poured with Lehigh Early Strength Cement, made replacement unnecessary. Then came sub-zero temperatures — Lehigh Early Strength Cement was used to reduce curing time and costs. Only 96 hours after placing floor of Hancock Bridge, a heavy shovel was run over it. In all cases forms were stripped in 4 days. Curing costs were lower by $350; completion was not delayed in spite of the 5° below zero average temperature. Lehigh Early Strength Cement was used in the floor slabs and rails of both bridges, and also in the piers of the Hancock Bridge.

Use Lehigh Early Strength Cement for work now under way—use it for work which must be done this winter—use it for an early start on work planned for next spring. Use it at any season where time saving will mean money saving, or for better, denser concrete.

LEHIGH PORTLAND CEMENT COMPANY, Allentown, Pa., Chicago, Ill., Spokane, Wash.

Faster - Bigger - New Diesel Powered

DUMPTOR

—Powered with Diesel engine—hauls bigger loads at higher speeds—New, improved Koehring W-60 Model Dumptor, again cuts costs of moving dirt and rock. All important features of other Dumptor models are available with the new W-60. Three speeds forward or reverse—instantaneous gravity dump—constant mesh transmission—oscillating front axle—large pneumatic tires for maximum flotation—more than enough power, Diesel or gasoline, are only a few of the reasons why—dirt and rock are hauled at lower costs with Koehring Dumptors.

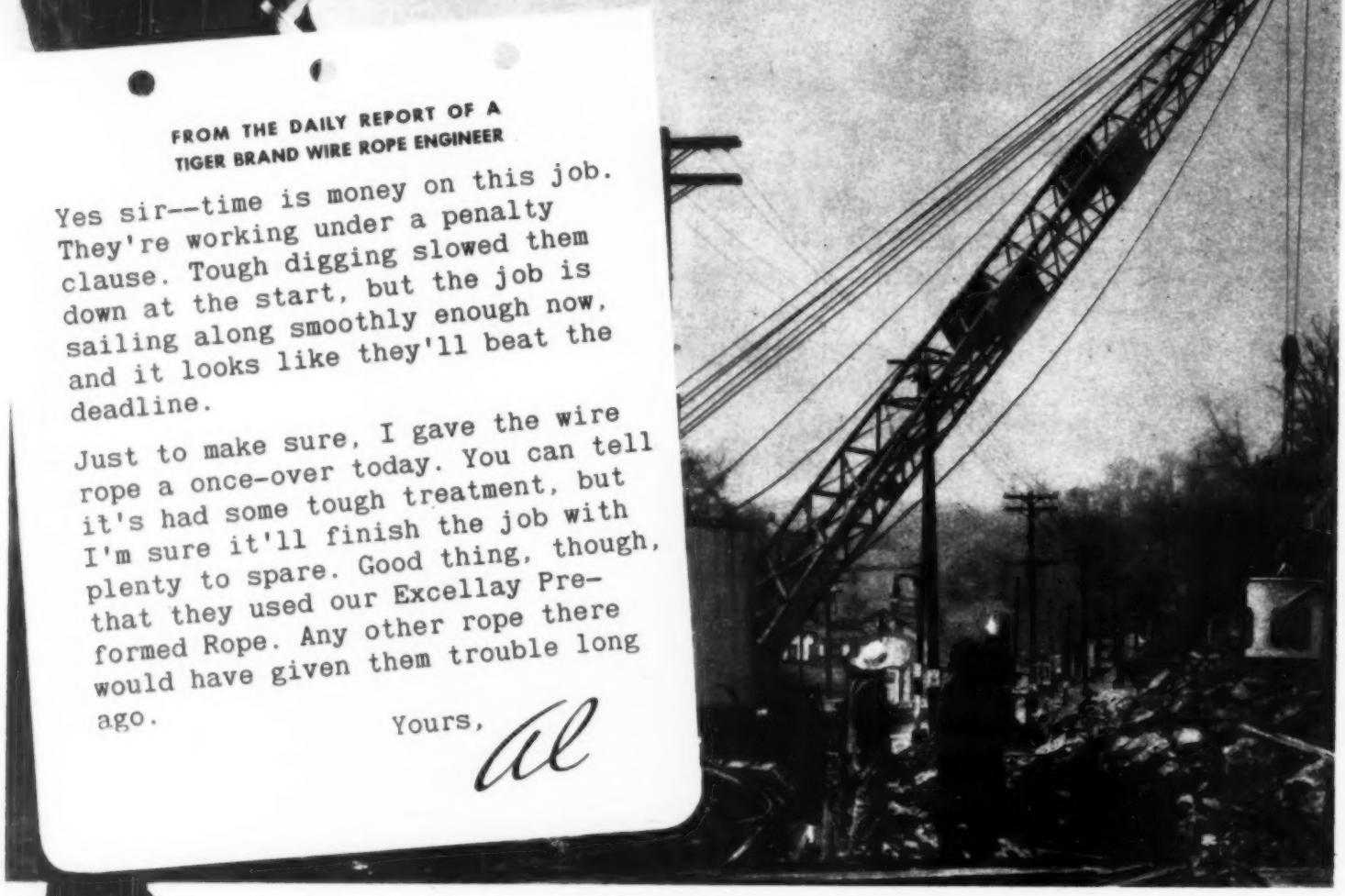
KOEHRING COMPANY
MILWAUKEE, WISCONSIN

Part of a large fleet of W-60 Dumptors hauling tunnel excavation on the Pennsylvania Turnpike.

KOEHRING HEAVY DUTY

HEAVY-DUTY CONSTRUCTION EQUIPMENT

...GOOD THING THEY USED EXCELLAY HERE



FROM THE DAILY REPORT OF A TIGER BRAND WIRE ROPE ENGINEER

Yes sir--time is money on this job. They're working under a penalty clause. Tough digging slowed them down at the start, but the job is sailing along smoothly enough now, and it looks like they'll beat the deadline.

Just to make sure, I gave the wire rope a once-over today. You can tell it's had some tough treatment, but I'm sure it'll finish the job with plenty to spare. Good thing, though, that they used our Excellay Preformed Rope. Any other rope there would have given them trouble long ago.

Yours, *Al*

TURN your wire rope questions over to a Tiger Brand Wire Rope Engineer. He lives and breathes wire rope, spends most of his time seeing it in action, checking its performance, studying ways and means of saving you money.

These engineers know what they are talking about, because they spend most of their time right out where the rope is used. They know what punishment it has to stand and how to stretch your wire rope dollar. Besides, they have no axe to grind—they are not interested in promoting any one construction or grade of wire rope over any other. For American Tiger Brand Wire Rope is made in all constructions and all grades.

EXCELLAY *Preformed* **WIRE ROPE**

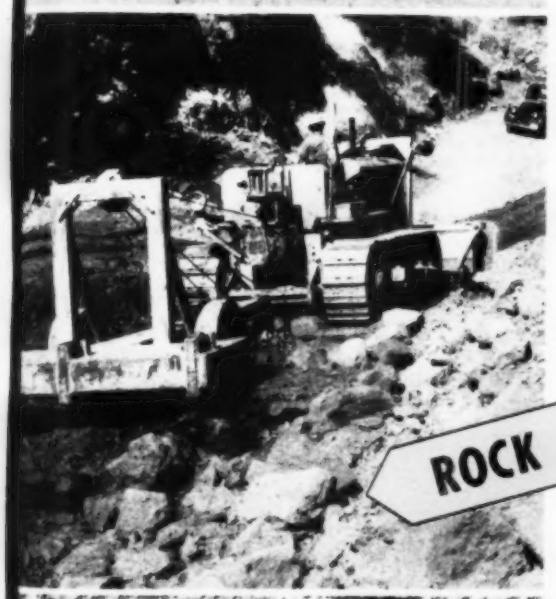
AMERICAN STEEL & WIRE COMPANY
Cleveland, Chicago and New York

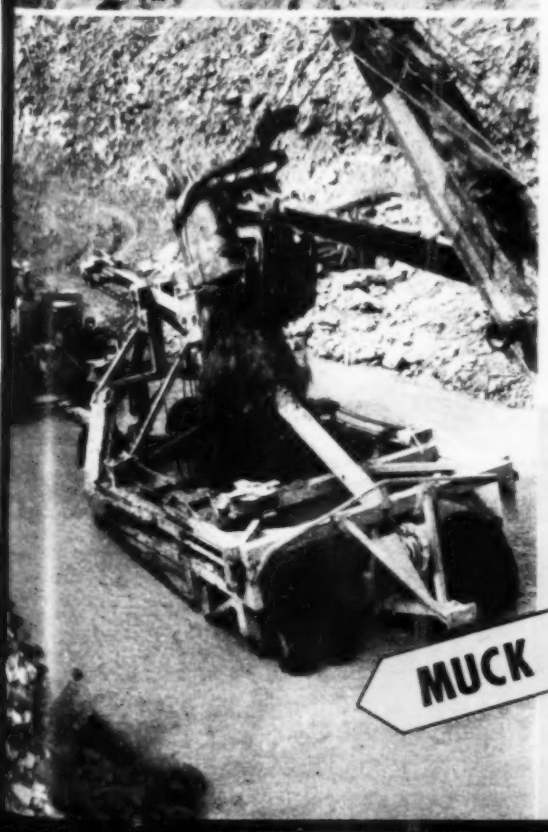
COLUMBIA STEEL COMPANY
San Francisco

United States Steel Products Company, New York, *Export Distributors*

UNITED STATES STEEL

Here's a Contractor who will never be at a loss





The performance now demanded of Rohl-Connolly Company's equipment on the 3,000-000-yard Deer Creek Dam, near Provo, Utah, may or may not have influenced its original purchase. Predicting working conditions on the next contract can only be a guess!

Yet, their veteran LeTourneau fleet and several newer models are handling every job assigned—faster...cheaper...over a wider work range than could be expected of any other tractor tools or methods. The fundamental difference is this: Every LeTourneau tool is built to give a minimum 10,000 hours' operation. In that time, material, weather and temperature variation demands LeTourneau features to permit constant operation at a profit. Why LeTourneau? Because most of them are exclusive with LeTourneau:

plow-like digging angle to penetrate naturally . . . self-sharpening cutting edges that stay sharp the life of the blade . . . Carryalls equipped with positive load ejector . . . patented box-beam all-welded alloy steel construction for greatest strength per pound . . . . large diameter machined steel sheaves, grooved for 3-way cable support . . . . with the complete line of LeTourneau tools standardizing on the same Power Unit plus the cable-saver double deck sheaves, to make the savings permanent! Ask your LeTourneau and "Caterpillar" dealer to demonstrate each "difference" in terms of savings to you!

R. G. LeTOURNEAU, INC., Peoria, Ill., Stockton, Calif.

To Specialize — Standardize on . . .

LETOURNEAU

ROOTERS* 'DOZERS CARRYALLS*

*Name Reg. U. S. Pat. Off.

LaPLANT-CHOATE

World-Famous *Profit-Producing*

The efficient, flexible "*Carrimor*" rear dumping scraper reduces loading resistance scientifically, loads larger loads with less power, cuts a smooth level grade, unloads sticky material with ease. Hydraulic control.

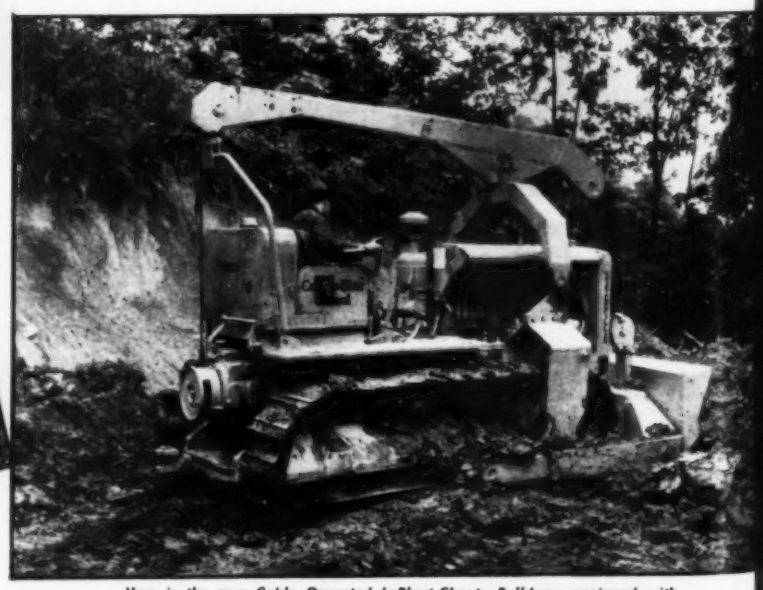
La Plant-Choate Trailbuilder . . . essential profit-making equipment. Can be used on practically any earth-moving or land clearing operation. Digs, spreads, pushes, levels, fills, etc. Complete hydraulic control.

To assure efficient, uniform tamping use *LaPlant-Choate Sheep-Foot Tamping Rollers*. Solid compaction of every layer . . . even compaction on rough ground . . . eliminates voids and waiting for fills to settle. Available in single, double and triple units.

For faster scraping and hauling, the *LaPlant-Choate* 16 yd. push out type scraper. Makes more trips per hour because it loads easier and dumps faster. Saves you time, money and worry.

To insure greater coordination and better balance between power, weight and strength, all LaPlant-Choate equipment is designed and built for use exclusively with "Caterpillar" Track-type tractors. Hence you can work the unit consistently at full capacity without fear of subjecting it to dangerous strain or tension.

Authorized "Caterpillar" and LaPlant-Choate dealers are located throughout the world to assure you of competent and readily available service facilities. This gives you added protection against delays in operation.



Here is the new *Cable Operated LaPlant-Choate Bulldozer* equipped with genuine "Caterpillar" Cable Control Unit. Rugged, powerful and performs with famous LaPlant-Choate efficiency. LaPlant-Choate quality makes it an outstanding value.

Get Full Details Today From Your LaPLANT-CHOATE and "Caterpillar" Dealer

Saves You Time and Money...

Equipment for Earth-Moving and Land Clearing Operations!

ALERT CONTRACTORS know that it isn't always necessary to get more money for their work to make *extra profits* . . . not when they have rugged, dependable LaPlant-Choate equipment to help make every operation profitable. That's why thousands use and recommend the efficient, versatile LaPlant-Choate line of Earth-Moving and Land-Clearing units.

Better and faster work at lower cost helps you land more jobs and enjoy added success. LaPlant-Choate equipment — designed and built by pioneers in the business — gives you time-saving assistance in meeting today's strict budgets and production schedules. Each tool is designed to perform a variety of operations — hence your equipment investment can be kept at a profitable minimum.

You want greater freedom from costly breakdowns and delays . . . elimination of slow, make-shift methods . . . lower production costs. LaPlant-Choate gives you these and many other advantages such as balance, stability, stamina, flexibility and the rugged strength to utilize the maximum power and speed of every unit day after day.

Be prepared for every job, large or small. Modernize now with LaPlant-Choate equipment. Write today for Free catalogs giving complete information on the complete line of LaPlant-Choate equipment.

LaPlant-Choate Bulldozers cut earth-moving costs. Positive hydraulic control assures absolute down pressure for digging; locking of blade in any position; fast, accurate work under the most trying conditions. Also available as Cable Control unit.

LaPlant-Choate Rake Type Blade saves time and money on rock picking jobs, piling brush and trees, scarifying and other land-clearing operation. Large heavy teeth are removable and the points hard faced to resist wear. Hydraulic control assures positive, accurate control.

Trees as large as 18" in diameter are taken out by the roots, deposited in a windrow and stump holes filled — all in one operation with a *LaPlant-Choate Tree Dozer*. Wades right through heavily wooded land or underbrush. Hydraulic control. A real time-saver.

LA PLANT-CHOATE MANUFACTURING CO. Inc.

CEDAR RAPIDS, IOWA.

ALL ROAD-JOBS LEAD TO...

Building an extension to the Skyline Boulevard, near San Francisco. C. F. "Duke" Clements' contract called for moving 91,000 yards of material. Here's a view of his "Caterpillar" Diesel Tractors, teamed-up with Le Tourneau scrapers, working 8 hours a day—in sand and rock! There are five sizes of "Caterpillar" Diesel Tractors, 25 to 97 horsepower at the drawbar. Horsepower to match any job!

"CATERPILLAR" DIESELS!

No MATTER how you look at road-building, every angle of the job points toward "Caterpillar" Diesel Equipment!

When you're considering cost-factors, for example, you'll wind-up with a choice of "Caterpillar" Diesels because of their small consumption of low-cost fuel. When it comes to putting real quality into the work, you'll swing to "Caterpillar" Diesels, again, because of their job-efficiency.

And the time-clause will add another okay for "Caterpillar" Diesels because of their outstanding work-capacity . . . their freedom from excessive replacements and repairs . . . and the advantage of having only one source of parts and service for all your equipment.

And remember this: All your equipment can be "Caterpillar" Diesel! Because this power is available in a variety of forms—engines, tractors, motor graders to meet every phase of the work; and a variety of sizes to fit large and small jobs. See your nearest "Caterpillar" dealer for more information, or write direct.

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

"Caterpillar" Diesel D17000 Engine powering Cedar Rapids Crusher (18 x 36 rolls) owned by H. Q. Gardner, Glenwood Springs, Colorado. Average output, 80 tons of 3/4-inch material. It works 15 hours a day on only 6½ gallons of 10-cent fuel an hour. Available in nine sizes (32 to 160 horsepower). "Caterpillar" Diesel Engines offer dependable, economical power for crushers, compressors, pumps, shovels and all other types of road-building equipment!

"Caterpillar" Diesel No. 12 Motor Grader, owned by the Max J. Kuney Co., Spokane, Washington. It is working on a new state highway near Toppenish, Washington, spreading gravel on the subgrade. This machine is the strongest, fastest operating, and most versatile motor grader available! Its wide-reach, high-reach, full-revolving blade makes ditch cuts . . . high-bank cuts . . . flat-bottom ditch cuts . . . low-bank cuts. Blade can be turned completely around, without the operator leaving his seat, for working in reverse on subgrades or in narrow quarters. Here's an outfit with the weight and flexibility to handle many angles of road-construction!

CATERPILLAR

REG. U.S. PAT. OFF.

DIESEL ENGINES • TRACK-TYPE TRACTORS • ROAD MACHINERY

NEW MODEL "99" LOADER SOLVES A MAJOR PROBLEM OF HIGHWAY CONSTRUCTION

Cutting solid material on high shoulder and loading it with windrowing.

Preparing the Grade: Windrowing excess material on parkway preparatory to loading.

● Now, removal of excess material . . . the cost-boosting nightmare of **shoulder, ditch** and **subgrade** construction . . . can be handled at a real profit.

The Austin-Western Model "99" Loader sets a new standard for clean, accurate, economical handling of excess materials on a wide variety of jobs . . . picking up and loading excess dirt between forms on paving jobs for balancing shoulders . . . quick, clean loading of loose or windrowed material . . . making its own cut of solid material.

Experience on actual jobs under a wide variety of conditions show that operations listed above, and many others, are handled by the A-W "99" Loader at savings of from **one-half** to **two-thirds** of usual loading time . . . demonstrate that 90 yards per hour is a conservative estimate of the capacity of this practical new highway construction machine. See your nearest A-W Dealer or write for full details. THE AUSTIN-WESTERN ROAD MACHINERY CO., Aurora, Illinois.

Austin-Western

Motor Graders
Loaders
Roll-A-Planes
Rollers
Snow Plows
Crushing and Screening Plants
Washing Plants
Blade Graders
Motor Sweepers
Shovels and Cranes
Bituminous Distributors
Elevating Graders
5-Yard Tractor Scraper
8-Yard Tractor Scraper
12-Yard Hydraulic Scraper

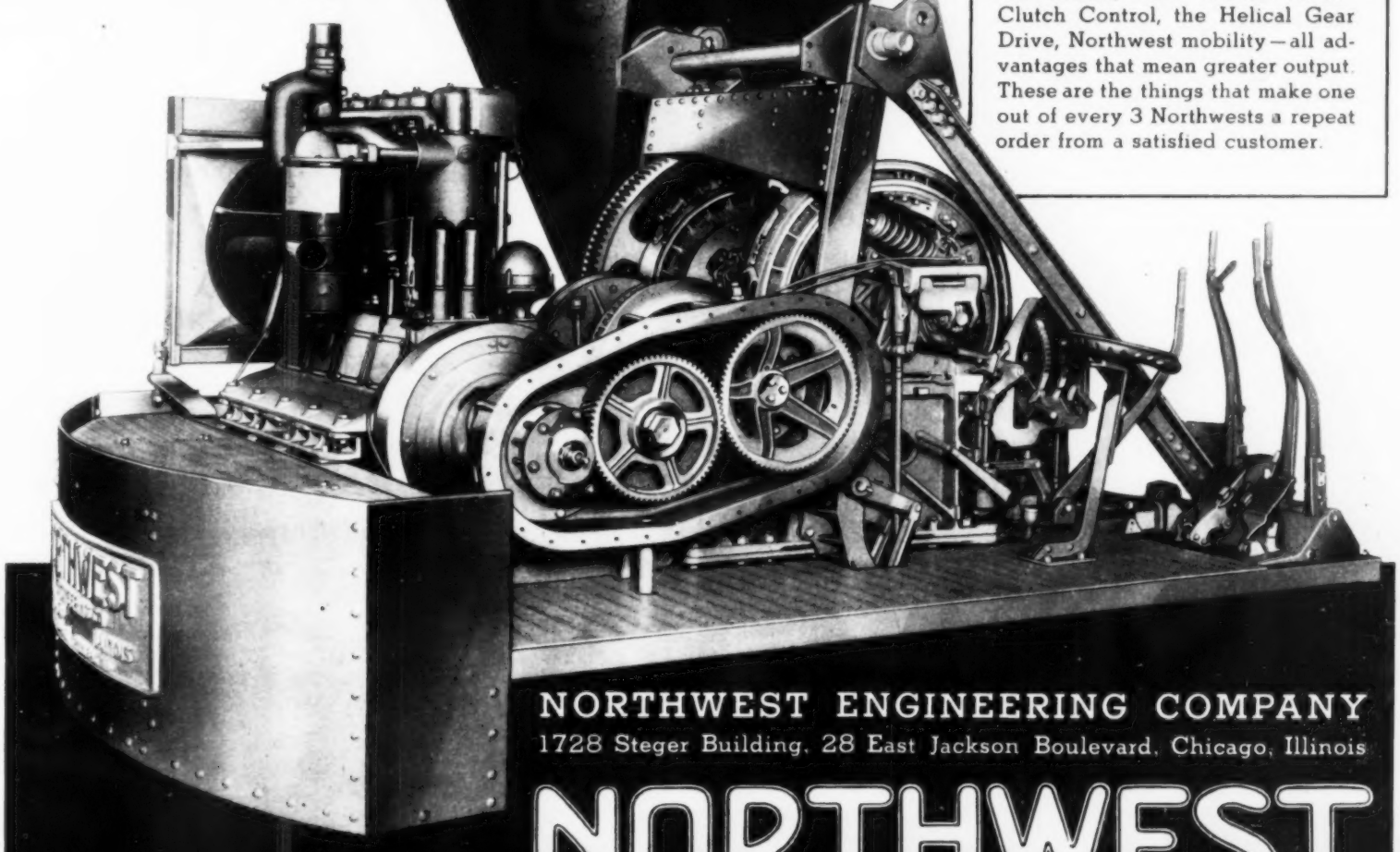
NORTHWEST SIMPLICITY LOWERS UPKEEP COSTS!

GASOLINE • ELECTRIC • DIESEL • OIL

Built in a range of 18 SIZES ⅜ yd. capacity and Larger

COMPLICATED machinery is costly machinery. Simplicity of design means easy upkeep, the transmission of maximum power—speed—output. Northwest design is free from complications. There are only three main shafts above the deck. Bearings on all high speed shafts are either ball or roller type and *always have been* since the first Northwest was built. Machinery side frames are cast steel and assure shaft alignment and freedom from wear that causes bearing troubles.

Add to this the other Northwest features—the Dual Crowd, the Cushion Clutch, the "feather-touch" Clutch Control, the Helical Gear Drive, Northwest mobility—all advantages that mean greater output. These are the things that make one out of every 3 Northwests a repeat order from a satisfied customer.



NORTHWEST ENGINEERING COMPANY
1728 Steger Building, 28 East Jackson Boulevard, Chicago, Illinois

NORTHWEST

Shovels • Cranes • Draglines • Pullshovels • Skimmers

BUCYRUS-ERIE 2-Wheel Scrapers put dirt in hard-to-get-to places. This dirt-moving unit dumps backward and behind its wheels, like a dump truck. But it doesn't get stuck in the soft dirt so often found at the edge of a bank or fill. The tractor always stays on solid ground, ready to pull the scraper out of the soft dirt.

Whether you're filling in around a bridgehead or a culvert; whether you have to widen a fill; or whether you just want to dump dirt over the edge of a bank . . . THIS SCRAPER will do the job for you without help from other equipment.

For complete information on all the dirt-handling features of the Bucyrus-Erie 2-Wheel Scraper, get in touch with your nearest International Harvester TracTracTor Dealer.

Bucyrus·Erie

SOUTH MILWAUKEE, WISCONSIN

JAEGER, ALONE, Gives You All These Pumping Features

Only $85 f.o.b. Factory—3000 Gallon Bantam Weighs But 52 Lbs.

JAEGER "PRIMING JET" — Up to 5 times faster priming and re-priming — often means difference between profit and loss on job. No adjustments — no need to "gun" engine.

POSITIVE RECIRCULATION CUT-OFF — It's controlled by flow, not pressure.

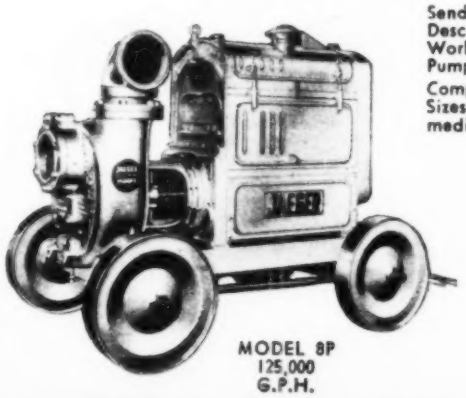
"FULL-RANGE" IMPELLER gives high efficiency under all conditions (built of steel in 4" to 8" sizes).

ACCESSIBLE SEAL — always outlasts the impeller.

PATENTED SELF-CLEANING SHELL — scours while pumping, won't clog, easily accessible.

DEPENDABLE, LONG LIFE CONSTRUCTION — means thousands of EXTRA hours of service.

EVERY PUMP INDIVIDUALLY TESTED for capacity and pressure before it leaves our factory.



MODEL 8P
125,000
G.P.H.

Send for Prices and New Catalog Describing Complete Line of World's Champion Sure Prime Pumps:

Compact 2", 3", 4" and 6" Sizes—Heavy Duty and Intermediate Types.

8" and 10" Sizes, Most Portable Big Pumps on Market — Capacities to 220,000 G.P.H.

Convertible Jetting-Dewatering Pumps (Two Pumps in One).

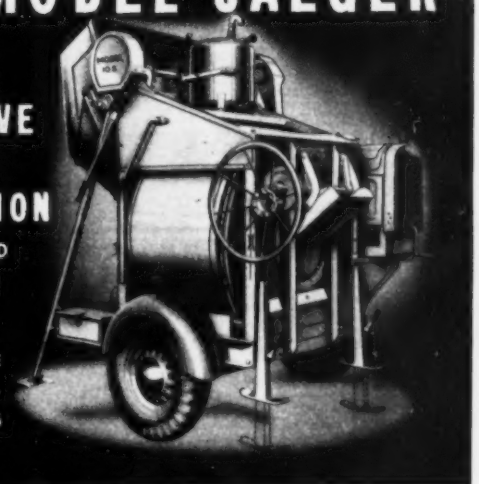
Vertical Caisson Pumps

Well Point Systems

Triplex Road Pumps.

NOW YOU CAN GET A 1940 MODEL JAEGER

with AUTOMOTIVE TYPE TRANSMISSION and MACHINED STEEL DRUM TRACKS



30% TO 40% MORE EFFICIENT — 90% LESS NOISE — YEARS LONGER LIFE.

5S-7S-10S-14S Alike in All But Size

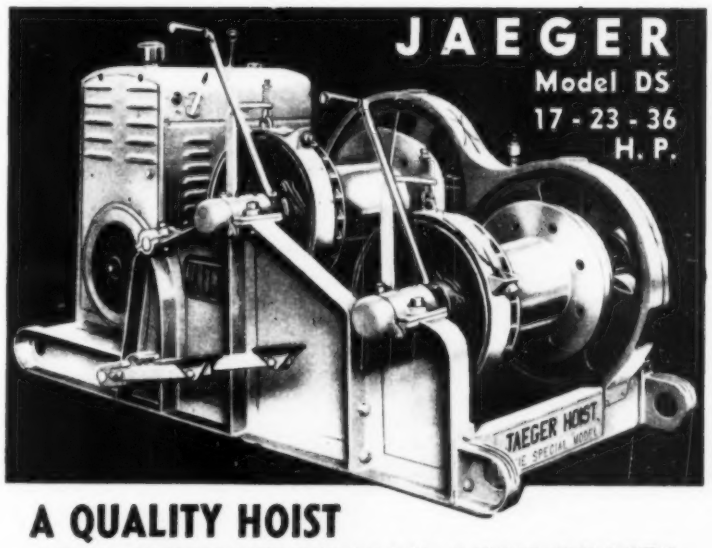
2½S End Discharge with Measuring Batch Hopper Mixes 30% to 40% More

They're light, they're fast, they're portable — yet they'll out-mix and out-last any heavy duty mixer you ever owned.

Gears run in oil, enclosed from dirt and weather — all shafts ball bearing. Machined steel drum tracks, chilled, ground rollers. Send for new Catalog, prices. THE JAEGER MACHINE CO., 800 Dublin Ave., Columbus, Ohio.

1940 SPEEDLINE MIXERS

BEST HOIST "BUY" EVER OFFERED!



A QUALITY HOIST AT A SENSATIONALLY LOW PRICE!

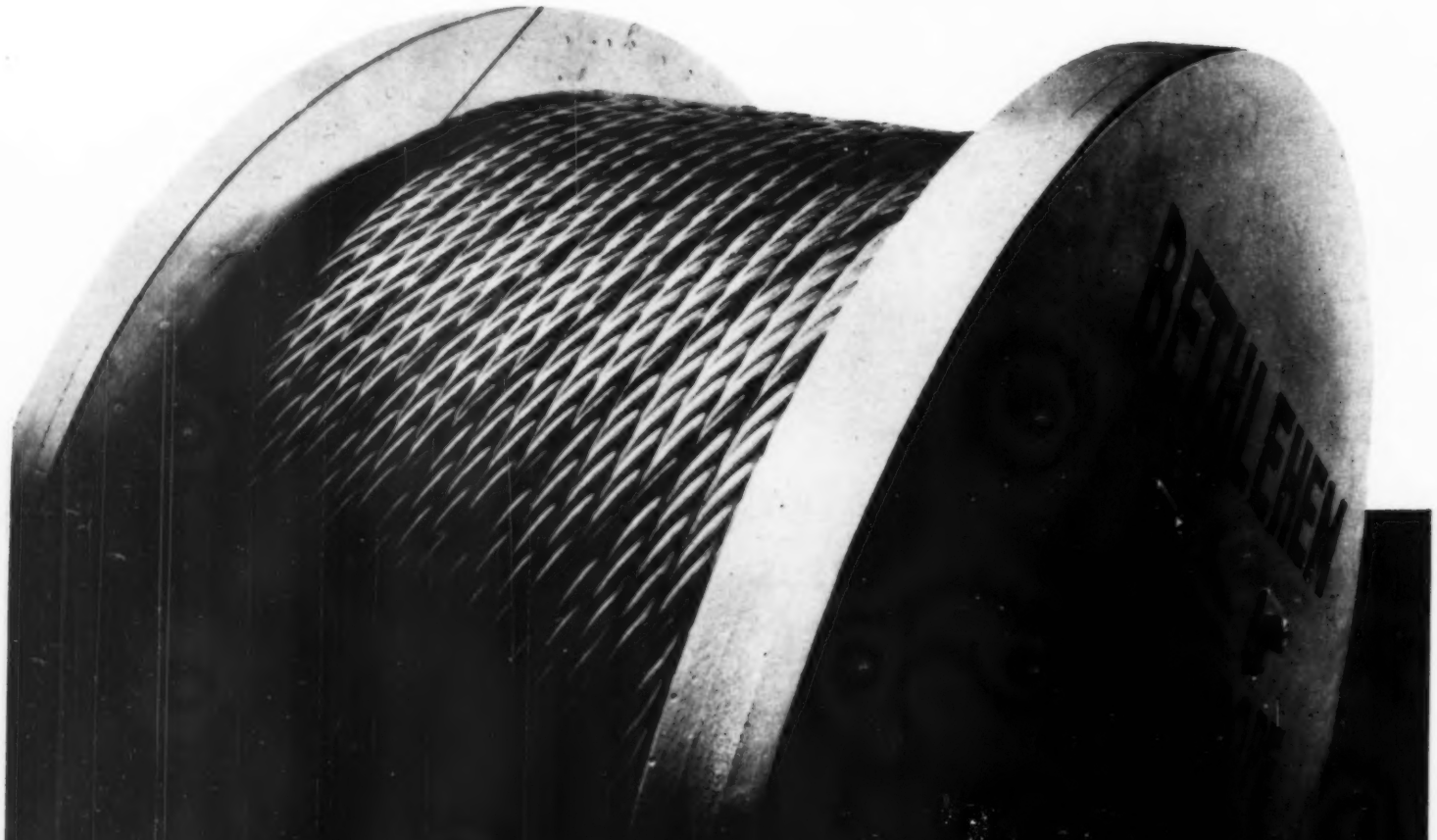
Other Jaeger Hoists 6 to 100 H.P. Touch control, many advanced features. Send for Catalog.

Easier operating with double cone, ball-bearing screw thrust. Combined all-steel side frames and base are 50% stronger. High quality bearings, powerful brakes, balanced drums, silent chain drive. Fills real need among contractors for a quality all-purpose hoist at popular price. One or two drum . . . gas or electric. Get details, prices. The Jaeger Machine Co., 800 Dublin Ave., Columbus, Ohio.

THE JAEGER MACHINE CO. 800 Dublin Ave. COLUMBUS, OHIO

For real service on *Wire Rope*

get in touch with your Bethlehem distributor



YOU'LL find the distributor for Bethlehem Wire Rope is a good man to know and have dealings with. You'll find that he knows his business thoroughly and that he is well able to suggest the best Bethlehem Wire Rope for your particular type of work.

You'll find, too, that your distributor's stock of Bethlehem Wire Rope is large and that he is backed to the limit in keeping it up-to-date by both the Bethlehem district warehouse and by the rope mill itself.

To be sure of prompt, efficient service on wire rope and of getting the grade and type that exactly meets your needs, get to know the nearest distributor for Bethlehem Wire Rope. A letter to Bethlehem Steel Company, Bethlehem, Pa., will bring you his name and address by return mail.

PURPLE STRAND IS BETHLEHEM'S TOP-QUALITY WIRE ROPE

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY

The Job You Want Done Is Being Done

with **CUMMINS** *Dependable* **DIESELS**

for Example

Hunkin-Conkey Co. works a Cummins Diesel-powered Euclid TracTruck on the Whitney Point (N.Y.) Dam. Unit hauls an 8-yd. payload ½ mile over a 5% grade—makes round trip in 10 minutes. Contractors prefer Cummins Dependable Diesels not only because they use fuel economically, but also because they stand up in the toughest sort of heavy-duty service—require minimum maintenance and service—assure faster, regular schedules.

CUMMINS ENGINE COMPANY • COLUMBUS, INDIANA

"GULF helps us ON A TOUGH SCHEDULE"

says

EMPIRE CONSTRUCTION

COMPANY SUPERINTENDENT

ON THEIR

TURNPIKE JOB

Empire Construction Company has an important strip of the Pennsylvania Turnpike for grading and excavating. This is one of the most important operations undertaken by this firm during recent years.

GULF'S HIGHER QUALITY LUBRICANTS keep our equipment on the job continuously

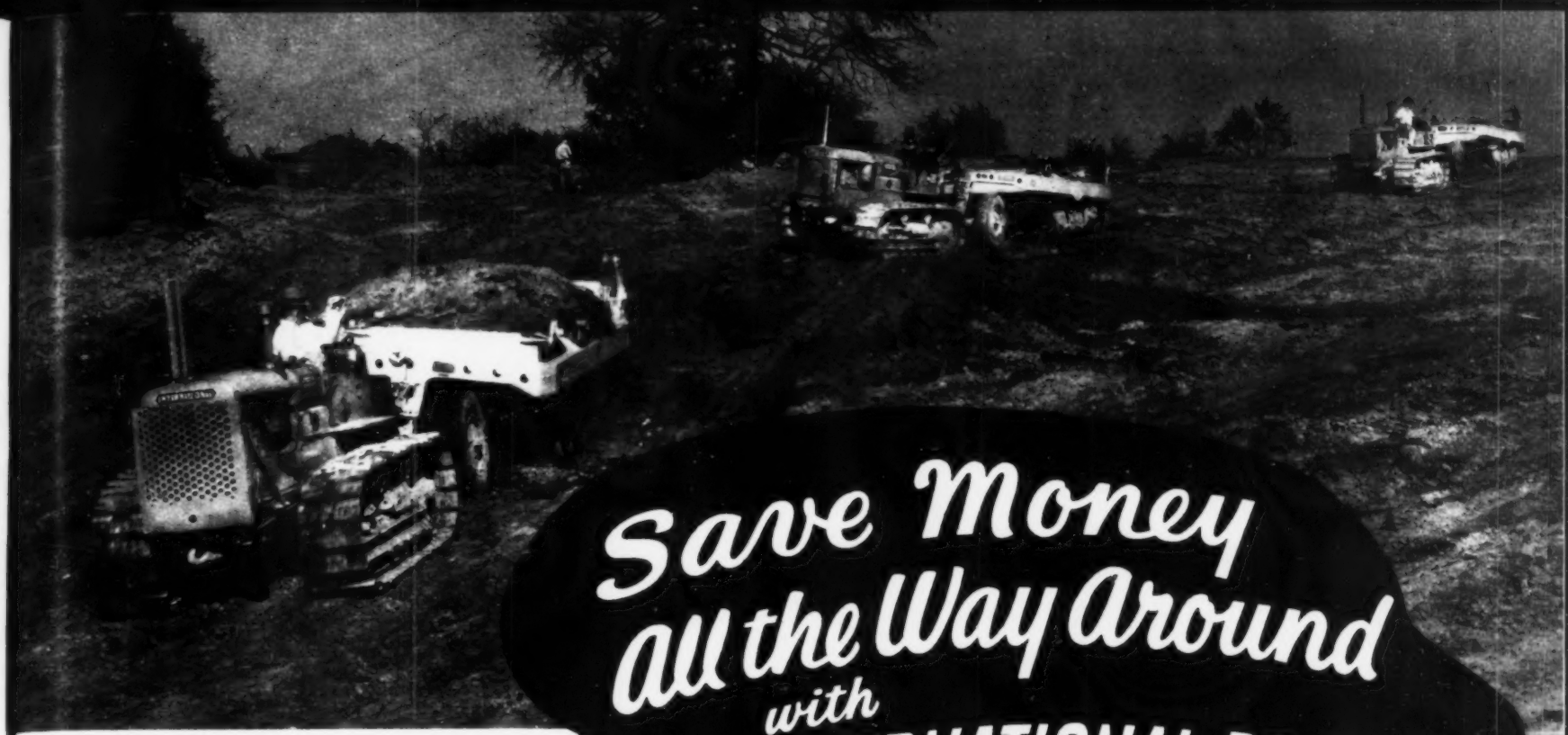
"We've made the dirt fly on this job—without troublesome delays or costly repairs for our equipment." says this superintendent. "Since we have standardized on Gulf quality lubricants and fuels heavy work schedules have been maintained."

You get these three big advantages when you use Gulf products: First, an experienced Gulf engineer recommends on the job the proper oils and greases for each requirement. Second, you're *sure* of getting lubricants exactly suited to your equipment—because the Gulf line includes several hundred different brands of oil and greases. Third, Gulf's wide distribution, through 1100 warehouses from Maine to Texas insures *prompt* delivery, no matter how remote the job.

GULF

Call in the Gulf engineer *now* and get the benefits of Gulf's higher quality lubricants and fuels. He can help you finish your job with a *bigger profit.*

GULF OIL CORPORATION
GULF REFINING COMPANY
Gulf Building . . . Pittsburgh, Pa.



Save Money all the Way Around with INTERNATIONAL POWER

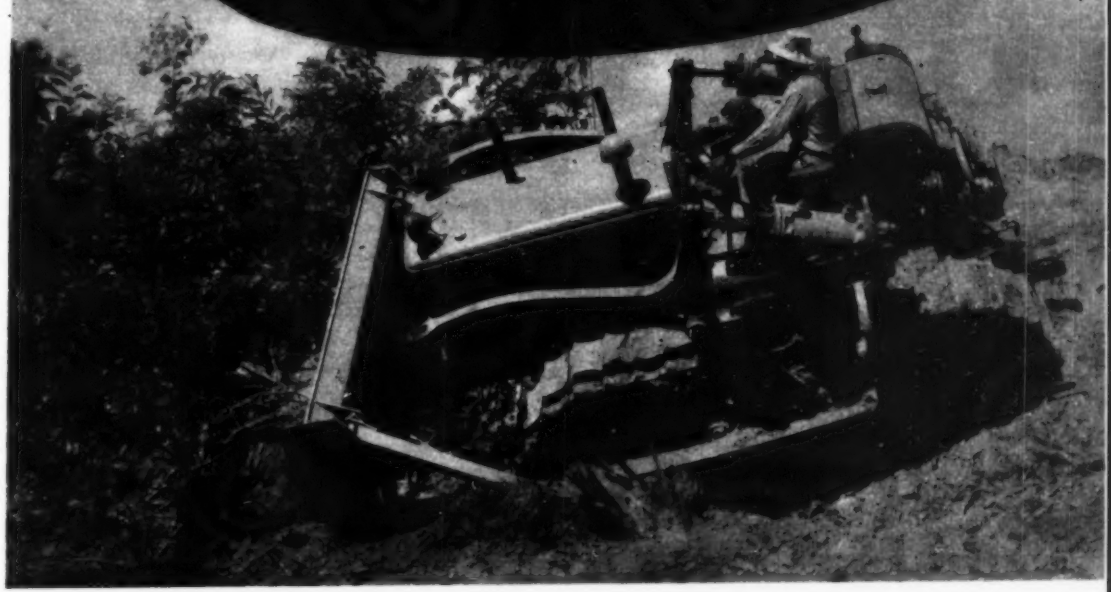
Above: A cubic yard a minute over a distance of 460 feet—that's the performance each of these three International TD-40 Diesel TracTracTors, pulling four-wheel scrapers, is turning in on this job

POWER that's in there getting results every minute, that stands up to the toughest job—*that's* INTERNATIONAL Power. More and more users are getting this power on their side—turning the *economy, stamina, dependability,* and *long life* of International TracTracTors, Wheel Tractors, and Power Units *into profits for themselves.*

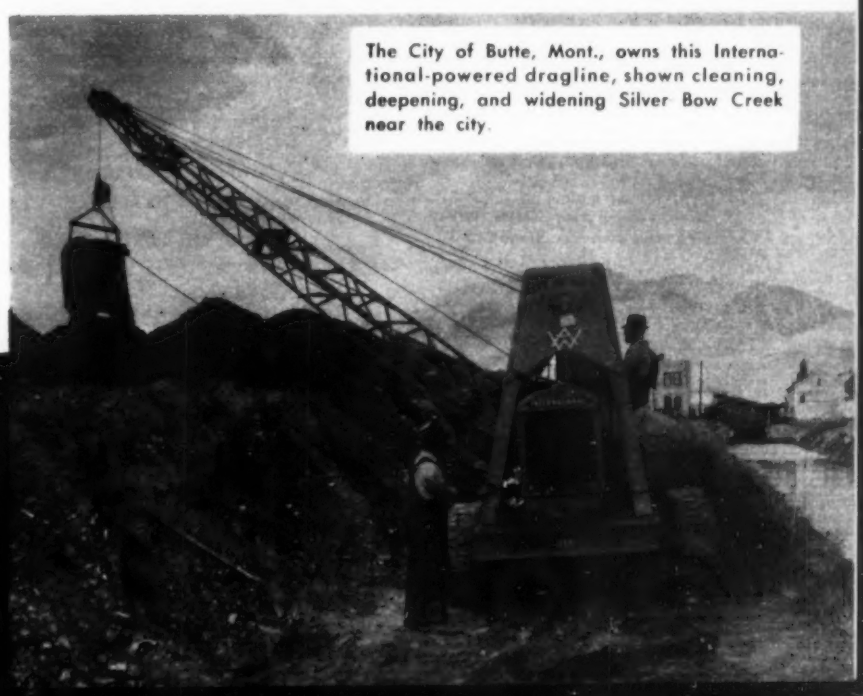
The more you see these outfits at work, the more you'll understand how International Harvester's sound engineering and quality construction pay out on the job. The features built into every model in the line add up to *more work per day* and *important savings on every operation.*

Get first-hand information on these International Harvester products yourself. Watch them at work and talk to owners. Check their performance and economy any way you like. Ask the nearby International industrial power dealer or Company-owned branch for full information. Then you'll realize why the tide is turning to INTERNATIONAL.

INTERNATIONAL HARVESTER COMPANY
(INCORPORATED)
180 North Michigan Avenue Chicago, Illinois



Above: On levee work in Kentucky with the new, big, powertul International TD-18 Diesel TracTracTor. Easy starting, easy steering, 6 forward and 2 reverse speeds, automatic clutch brake, power release steering clutches these are a few of the valuable features built into the TD-18 that mean more work and lower costs.



The City of Butte, Mont., owns this International-powered dragline, shown cleaning, deepening, and widening Silver Bow Creek near the city.

INTERNATIONAL INDUSTRIAL POWER

Cut Costs, Speed Work . . . Use Atlas High-Early cement for cold-weather construction!

Top: *Placing Atlas High-Early concrete.* Note its easy workability and freedom from segregation. Atlas High-Early gives you time enough to place it properly. Then sets rapidly and gains full strength quickly.

Bottom: *Race against time* won by contractors on the Bronx-Whitestone Bridge, New York City, despite cold weather, thanks to Atlas High-Early cement.

CONTRACTORS and engineers have found that it pays to use Atlas High-Early cement for cold-weather concrete. Even though this cement is slightly higher in initial cost, frequently you offset that *before you finish construction*. For Atlas High-Early cement makes possible important savings that in the long run may spell greater profits. And here's how:

Speeds Construction—Atlas High-Early cement gains strength several times faster than normal portland and so permits earlier use of concrete. You finish jobs faster, cut overhead costs, and release tools and machinery for other work. (Handy, too, when you have a penalty clause in your contract!)

Saves on Forms—As forms may be struck more quickly, frequently within 24 hours, fewer sets of forms may be needed.

Cuts Time Required for Protection and Curing—as much as 60% to 70%.

Promotes Winter Construction—Because of these factors, Atlas High-Early cement makes it economical to do work during the winter which might otherwise be postponed.

Consider these factors in studying the cost and time factors on your next job. You may be able to reduce costs, save time, and increase profits. Universal Atlas Cement Co. (United States Steel Corporation Subsidiary), Chrysler Building, New York City.

When you use this cement for cold weather concrete you take a jump toward lowered costs and increased profits!

CM-H-2

Atlas High-Early Cement

A UNIVERSAL ATLAS PRODUCT

Construction Methods

ROBERT K. TOMLIN, Editor

Volume 21 | DECEMBER, 1939 | Number 12

Well Casing

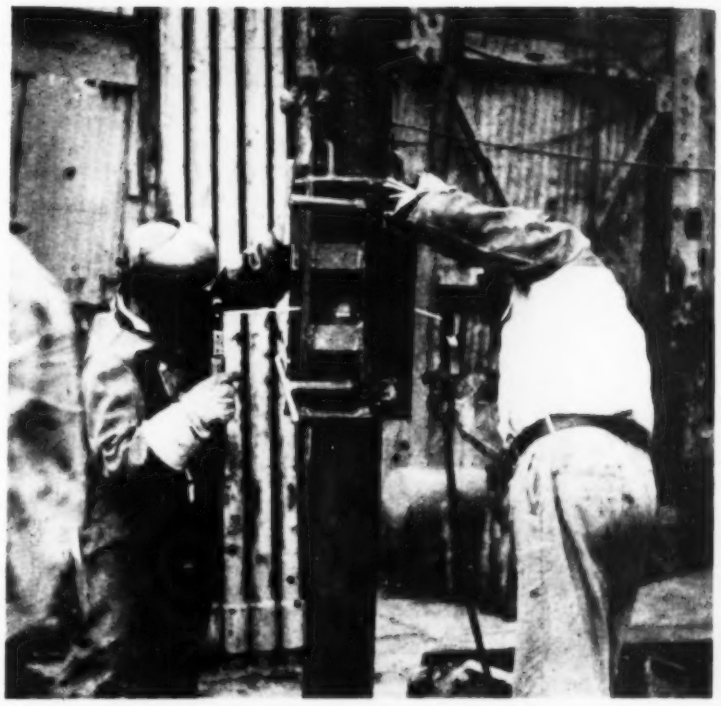
WELDED TO RECORD LENGTH OF 8,100 FT.

WHAT IS CLAIMED to be the world's longest string of welded casing was set last year by the Carter Oil Co. in its Carter-Harley No. 1 well near Milroy, Okla. The length of the string was 8,100 ft.

The National Tube Co.'s 7 in. OD, 26-lb., range 3, special casing was used. Two types of joints were welded, the "U" bevel on plain end pipe and the "V" bevel, commonly used on shorter strings. The welding equipment used included Shield-Arc 85 electrodes and 300-amp. dual continuous control arc welders supplied by the Lincoln Electric Co.

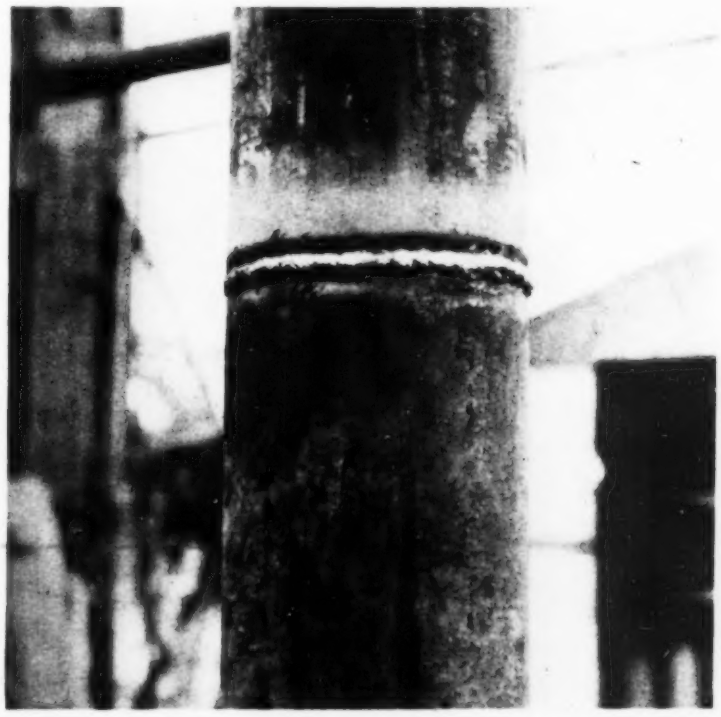
L. R. Hodell of the Carter Oil Co. supervised the job, with Boris Robinoff and H. M. Cooley of the National Tube Co. and R. L. Looney, welding engineer for the Big Three Weld-

(Continued on page 70)



LINE-UP CLAMP holds casing pipe in position for welding joint.

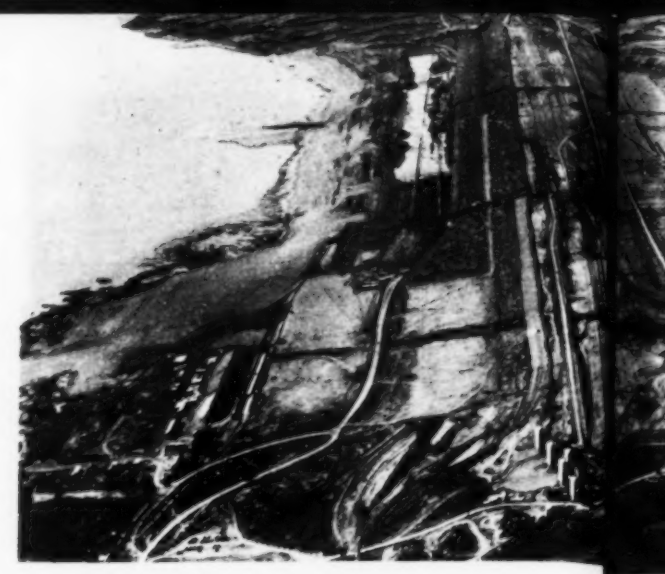
ARC WELDING 8,100-ft. well casing, longest welded string on record.



FINISHED WELD connects pipe on world's longest welded well casing

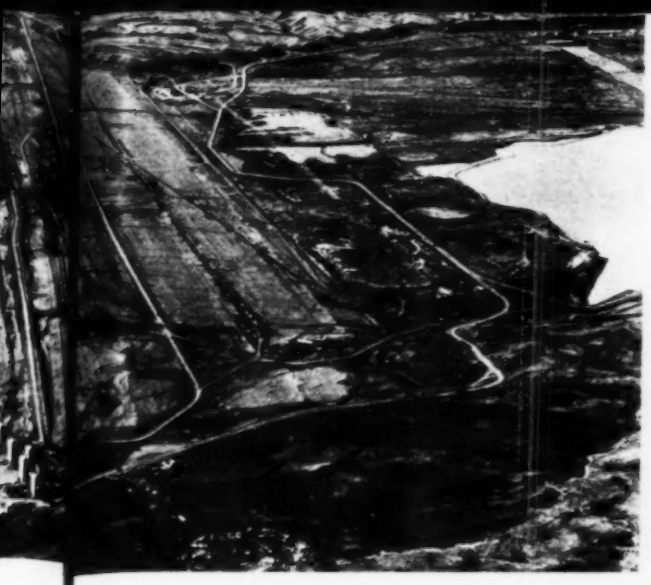
THIS MONTH'S NEWS REEL

FOR CHICAGO'S NEW SUBWAY pair of 200-ft. long steel tubes **(above)**, with ends temporarily sealed, are towed to point where they will be sunk in trench in bed of Chicago River to provide crossing for State St. route. Fabricated by Graver Tank & Mfg. Corp., of East Chicago, Ind., the steel tube structure, 200 ft. long, 40 ft. wide, 23 ft. high and weighing 6,500 tons, was arc-welded with the aid of Lincoln equipment. Contractor for project is Merritt-Chapman & Scott Corp., of New York City.



JOHN D. ROCKEFELLER, JR. drives last rivet Nov. 1 in final building of group constituting Rockefeller Center, New York City. With 60-lb. riveting hammer, owner of property signalizes end of 8-yr. construction program with silver-alloy rivet driven in column of lobby of fourteenth and last structure at 48th St. and Sixth Ave. After ceremony rivet, suitably engraved, was incased in glass for permanent display in column of lobby of building.

GROUND BREAKING AT FRIANT DAM (left), important feature of U. S. Bureau of Reclamation's Central Valley project in California, is signalized Nov. 5 by huge blast at south abutment. Dam when completed will be concrete structure 300 ft. high and 3,430 ft. long. **OPENING OF BIDS FOR FRIANT DAM (inset),** by U. S. Bureau of Reclamation is followed by award of $8,715,358 contract to Griffith Co. and Bent Co., of Los Angeles, Calif., whose tender was lowest of those submitted. At bid table, representing U. S. Bureau of Reclamation are, left to right: James H. Warner, resident engineer; R. B. Williams, construction engineer; Walker R. Young, supervising engineer of Central Valley project; Miss Nell Boylin, clerk of Sacramento office; Harry S. Riddell, assistant engineer; D. J. Hunt, reading bid; and J. R. Sutherland, associate engineer.



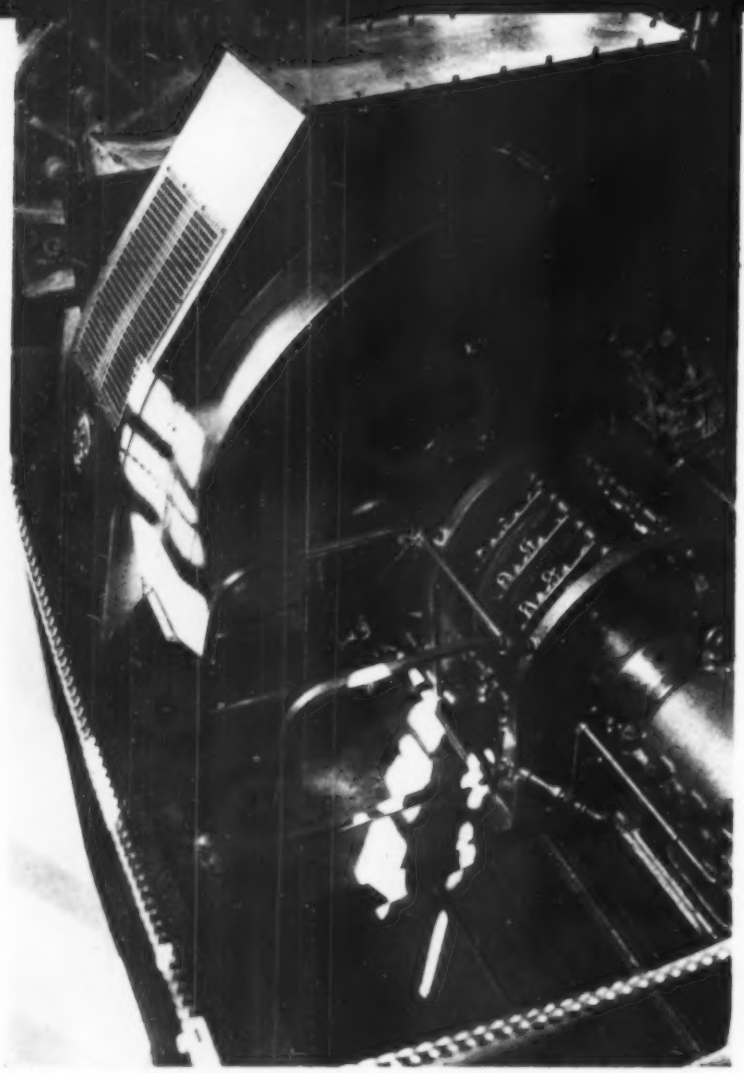
PLACING OF HYDRAULIC FILL in upstream berm of Fort Peck dam on Missouri River, in Montana, was completed Nov. 5 by U. S. Engineer Department dredges Jefferson and Missouri. Dam, as pictured herewith, still licks 25 ft. of final 250-ft. height and will be "topped out" next year by rolled-fill method. Total hydraulic fill now in place is 122,178,000 cu.yd. View is looking west from east abutment, showing control towers for gates in center foreground. Reservoir formed by dam is at left. Dam, with maximum base width of 4,900 ft., extends 2 mi. across Missouri River valley and is joined by dike section extending another 2 mi. beyond west abutment.

PROGRESS AT SHASTA DAM. U. S. Bureau of Reclamation structure across Sacramento River in California, reaches stage where excavation by Pacific Constructors, Inc., general contractor, is nearing completion after more than a year's work. Derricks at right are placing first steel in legs of 460-ft. high head tower which will be central feature of huge cableway system of seven radiating high lines covering entire damsite, scheduled to start placing concrete next spring. At upper left is seen cavity gouged down to bedrock on east abutment. Dam, 560 ft. high, will contain 5,600,000 cu.yd. of concrete to be placed by buckets from cableway.

FALL OF DERRICK WRECKS BRIDGE (above). under construction for Belt Parkway in Brooklyn, N. Y. City, at Plum Beach channel. Accident resulted from drop of 50-ton 120-ft. long steel girder which was being hoisted to place by guy derrick. Bridge, 80 ft. wide, consists of three 120-ft. spans being erected by Taylor-Fichter Steel Construction Co. At time of accident east span had been erected and derrick rested on end of center girder.

HOLING THROUGH OF QUEENS-MIDTOWN TUNNEL. which will carry vehicular traffic under East River between boroughs of Manhattan and Queens, New York City, was accomplished Nov. 8 by sandhogs of Walsh Construction Co., who lead Mayor LaGuardia through opening in rock bore. Twin tubes 6,414 ft. and 6,272 ft. long, respectively, were driven by four shields, each 31 ft. 8 in. in diameter, two working outward from each shoie. Jack MacDonald is general superintendent for contractor and Ole Singstad is chief engineer for N. Y. City Tunnel Authority.

PALOS VERDES RESERVOIR (right). distribution terminal for Metropolitan aqueduct, serving Los Angeles and group of other California communities, is excavated by Le Tourneau carryall scrapers and shaped on sloping sides, after consolidation of earth by sheepsfoot rollers, with Caterpillar diesel motor-grader owned by W. E. Hall Co., contractor. Slope is first cut down to within 4 in. of grade by tractor-bulldozers and then fine-graded with motor-grader preparatory to placing concrete lining.



4,000-HP. INDUCTION MOTOR direct-connected to main 30-in. pump has rated current capacity of 282 amp. at 6,600-v., three-phase, 60-cycle current, but now takes 330-amp. overload rating because condenser has raised power factor, thus increasing power available at pump by 17 per cent.

Electric Power DRIVES DREDGE PUMPS AT KINGSLEY DAM

TO PLACE 26,000,000 CU.YD. OF HYDRAULIC FILL for the Central Nebraska Public Power & Irrigation District in Kingsley dam on the North Platte River, the Minneapolis Dredging Co.-Martin Wunderlich Co., joint holders of a $5,000,000 contract for the job, operate two electric dredges equipped with 30-in. main pumps driven by 4,000-hp. motors. Sending river sand and gravel through 4,000-ft. average length of pipe, the dredges pump water to carry solids into the dam at the scheduled rate of 1,800,000 cu.yd. per month. With the two dredges pumping, the job draws 6,000 kw. of electric power.

Supplying power to the 4,000-hp. 6,600-v. motors which turn the dredge pumps is a job substation equipped with six transformers of 12,000-kva. total capacity and a synchronous condenser which regulates the voltage and improves the power factor on the 6,900-v. line to the dredges. Power comes to the substation over a 69,000-v. transmission line from the Sutherland and Columbus projects which, in common with the Tri-County project (Kingsley dam and auxiliary works), have received federal aid in the form of PWA loans and grants.

On each dredge additional transformers reduce 6,900-v.

UPSTREAM DREDGE KEYSTONE (below) receives 6,900-v. power over three single-conductor 600,000 c.m. cables of General Cable Corp., 1,760 ft. long, supported in racks on pontoons. Pontoon pipe is 30-in. I.D., ½-in. wall, in 50 ft. lengths; couplings are ball joints by Mobile Pulley & Machine Works. Two complete dredges were supplied by Bucyrus-Erie Co. Steel hull 125 ft. long by 40 ft. wide by 10 ft. deep consists of nine rectangular sections made in manufacturer's South Milwaukee plant, shipped separately on flat cars and welded together in field, forming hull with fourteen compartments. Dredge is designed to dig to depth of 45 ft. below water and is held to digging while swinging across cut by either of two spuds, 40-in. outside diameter by 70 ft. long. Spuds are attached to hull and to overhead spud gantry in annealed cast-steel circular gates with pin-connected caps. Spuds are raised by sliding clamp connected directly to hoist ropes which lead to top of stern gantry and thence to winch machinery. Total overall weight of dredge is about 1,000 tons. Above roof is 15-ton derrick which proves extremely useful for lifting pump parts.

WITH FIRST STAGE OF CONSTRUCTION COMPLETED, contractor starts core-pool operation in October from 30-in. beach lines carrying material from two dredges, one operating in upstream dredging area and other in downstream dredging area.

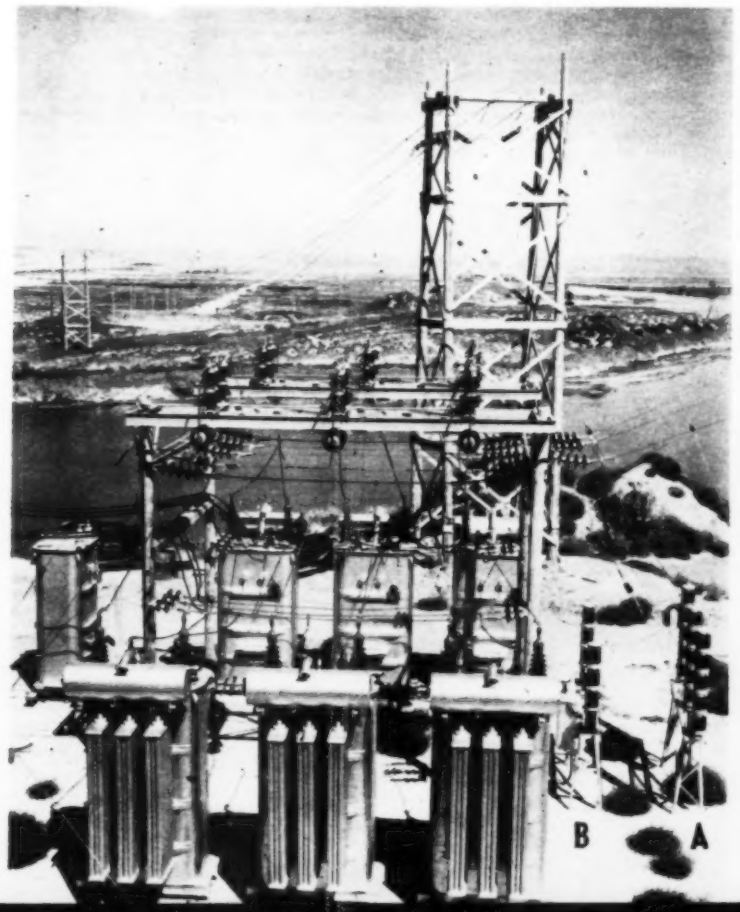
power to the proper voltages for a 500-hp. 2,300-v. cutter motor and for 440-v. motors of a 150-hp. hoist and two 75-hp. service pumps. A small transformer steps down the 6,900-v. power to 110 v. for the lighting circuit and small power tools.

Up to the middle of September power consumption on the job amounted to 3,250,000 kw.-hr. per month. In this period, one dredge worked 16 hr. a day, and the second dredge worked 24 hr. Since September, the two dredges have gone on a full 24-hr. schedule, and power consumption has risen accordingly to 140,000 kw.-hr. per day.

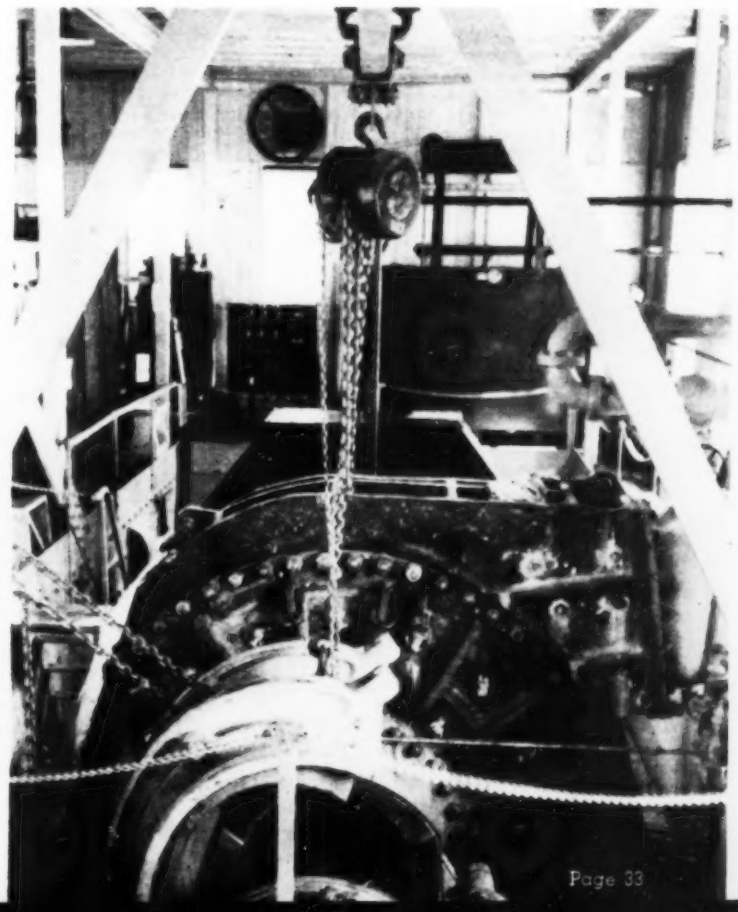
Smaller electrical equipment on the project is served by separate transformer banks which convert 6,900-v. power to lower voltages for motors and lighting circuits. A number of lighting towers carrying batteries of powerful floodlights are set up on the dam to facilitate night operations.

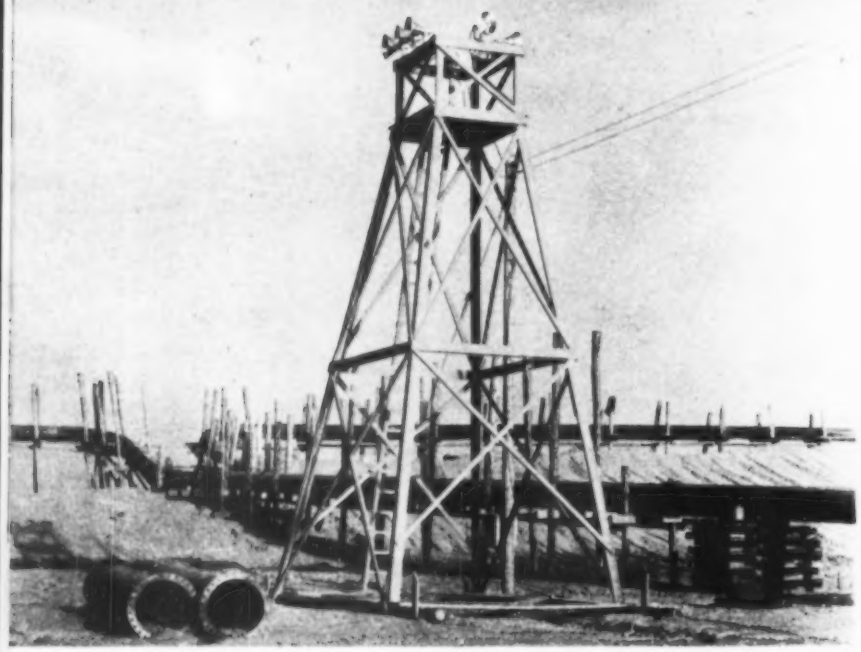
Administration — For the Central Nebraska Public Power & Irrigation District, George E. Johnson, former state engineer of Nebraska, is chief engineer and general manager, and George N. Carter is resident engineer at Kingsley Dam. Operations of the Minneapolis Dredging Co. (Minneapolis, Minn.)-Martin Wunderlich Co. (Jefferson City, Mo.) are directed by George P. Leonard, general superintendent.

TWO BANKS OF THREE MOLONEY 2,000-KVA. TRANSFORMERS (below). Y-connected to 69,000-v. high-tension system at upper level and delta-connected to 6,900-v. three-cable low-tension systems at lower elevation, provide total transformer capacity of 12,000 kva. Reserve transformer sits at left. At right are three G.E. lightning arresters (A) and two G.E. capacitor units (B), or telephone couplings, which serve in connection with G.E. carrier current equipment to put telephone messages on high-tension line.

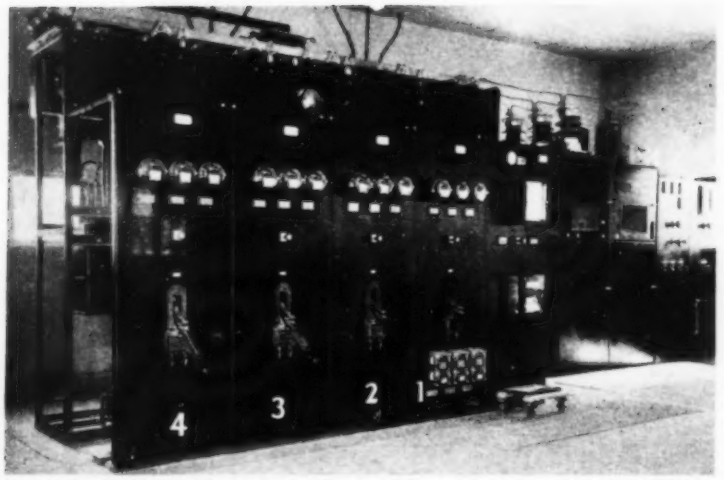


MAIN DREDGE PUMP HAS 34-IN. SUCTION (in which manhole section has been raised to permit welding repair) and 30-in. discharge **(below).** Pump is driven at synchronous speed of 360 r.p.m. by 4,000-hp. variable-speed motor with liquid rheostat control of sufficient capacity to allow motor to operate continuously at maximum speed reduction of 30 per cent. Differential chain hoist of 2-ton capacity on overhead trolley I-beam raises manhole section.

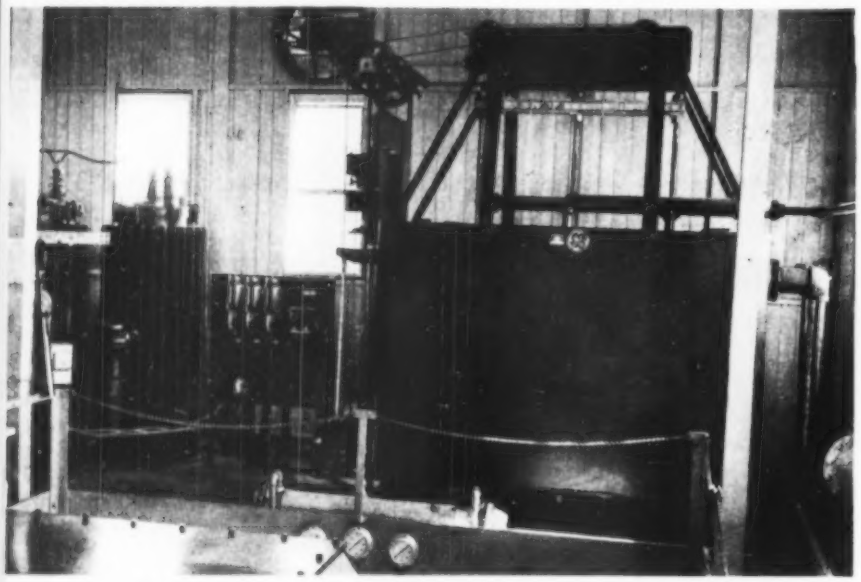




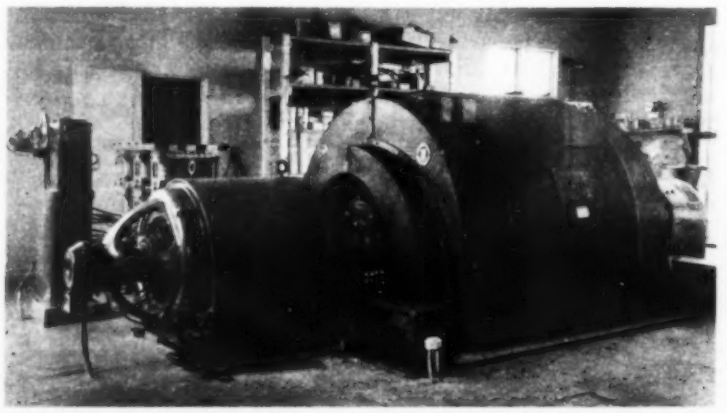
TYPICAL TIMBER FLOODLIGHTING TOWER carries nine 750-1000-w. floodlights, six Crouse-Hinds and three Westinghouse. Behind light tower is feeder pipe, 30 in. I.D., ¼-in. wall, 50-ft. sections, Dresser couplings. Manually operated gate valve diverts flow to either of two 30-in. beach lines at Y in background.



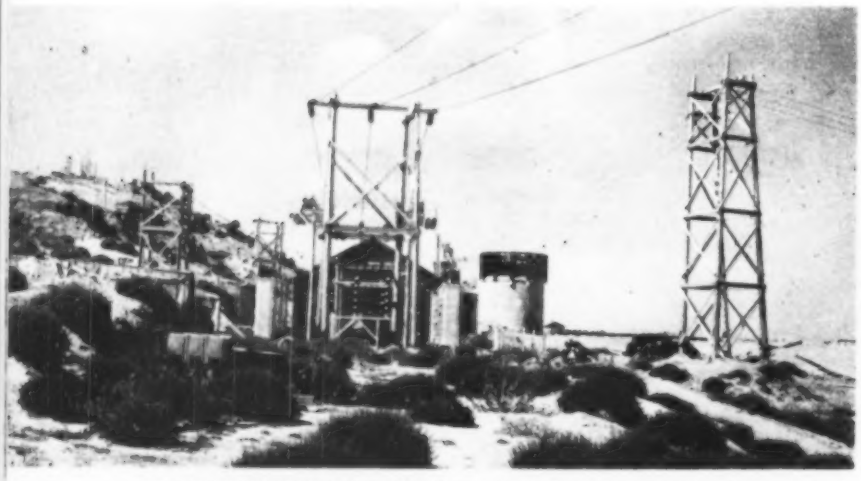
FOUR SWITCH PANELS serve power lines on project. Westinghouse switches make and break circuits in (1) main bus from transformer station outside, (2) power line to dredge No. 1, downstream, (3) line to dredge No. 2, upstream, and (4) line to core pool and camp. Immediately to right of switch panels is automatic recording graph for power consumption, and in right background stand cabinets housing Westinghouse automatic switch gear for synchronous condenser.



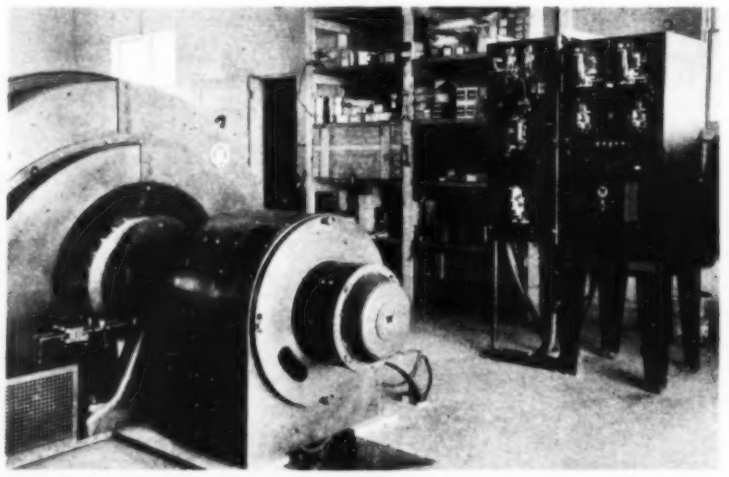
LIQUID RHEOSTAT, OR SLIP-REGULATOR, utilizes large tank filled with solution of soda ash and water, connected in series with the secondary (rotating) side of 4,000-hp. motor. Between liquid rheostat and transformers at left is short-circuit switch across slip rings of secondary side of 4,000-hp. motor. After motor is up to speed, hand-thrown switch on main switch panel is pulled, breaking short-circuit switch and cutting out rheostat. Partially visible at left are three G.E. transformers, of 250-kva. capacity each, reducing 6,900-v. power to 440-v. for auxiliary motors on dredge. Single small transformer in front of large transformers is 10-kva. unit stepping down 6,900 v. to 110 v. for independent lighting circuit.



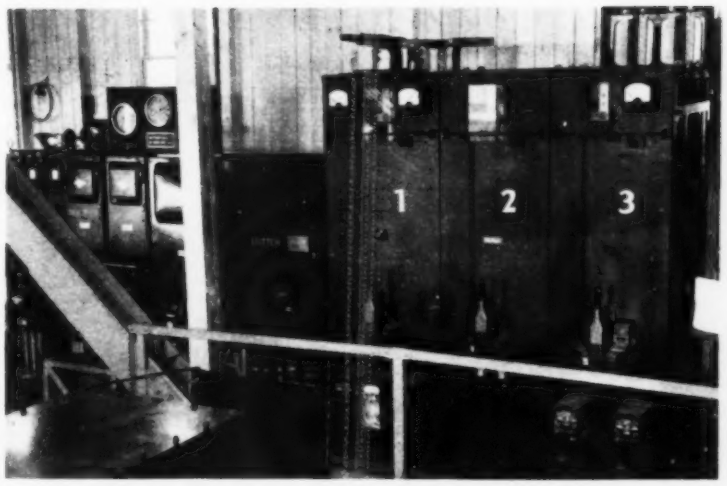
SYNCHRONOUS CONDENSER floating on power line supplying two dredges is over-excited to bring up power factor. Induction motors on dredges have low power factor; without synchronous condenser, voltage drops several hundred volts—7,200 volts drops to 6,800 volts when only one dredge is operating. It is impossible for two dredges to operate without condenser. Westinghouse condenser, 7,500-kva. capacity, 7,200-4,150 v., 600-1,040 amp., is connected at 7,200 v., 600 amp. Automatic switchgear apparatus acts as voltage regulator and takes care of voltage changes caused by changes in load. To left of synchronous condenser motor is direct-connected 100-hp. induction motor for starting. Behind starting motor stands resistor unit connected into rotor circuit of induction motor to control starting speed; switches with push-button control regulate resistance and speed. Condenser starts as generator and is brought up to synchronous speed and proper voltage before it is connected across line; it then runs as synchronous motor. At right of condenser motor, direct-connected, is shunt-wound d.c. generator, 40 kw., 125 v., 320 amp., used as exciter. Rated speed of all units is 900 r.p.m.



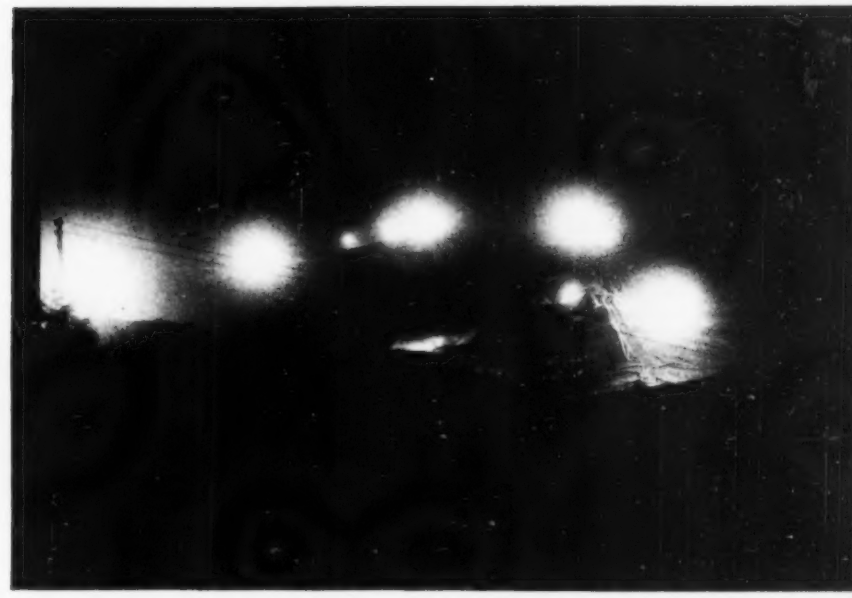
JOB SUBSTATION takes 69,000-v. power from transmission line, directly overhead, and steps it down to 6,900 v. for delivery to dam and dredges over line at right, and to shaft hoists and contractor's camp over line climbing south abutment at left.



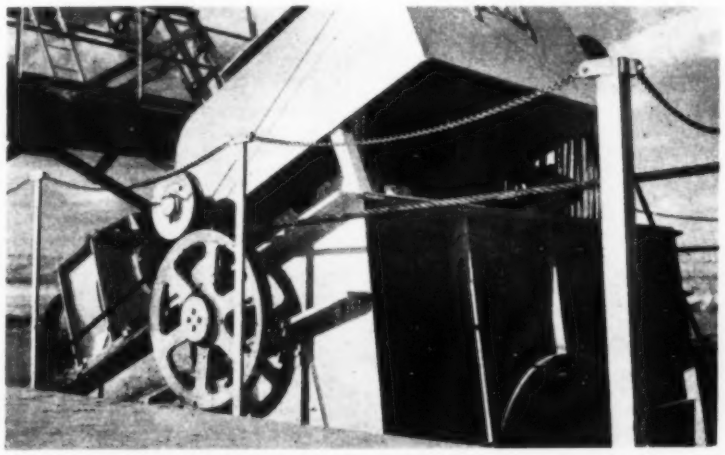
FIELD RHEOSTAT controlled by voltage regulator in switchgear apparatus increases or reduces resistance in shunt field of exciter motor and thus acts as voltage stabilizer for synchronous condenser floating on power line to dredges.



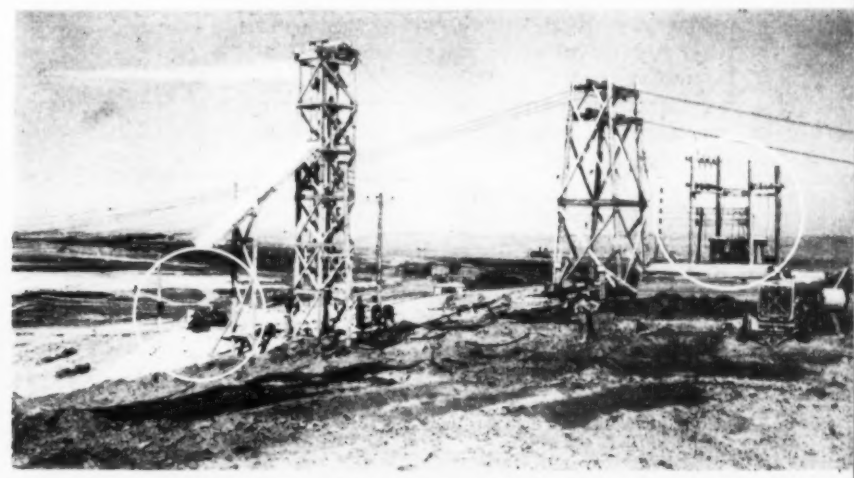
THREE SWITCH PANELS ON DREDGE COMPRISE: (1) Main switch connected with incoming bus, (2) switch serving 440-v. and 220-v. systems (440-v. is control circuit, and 220-v. is service circuit), and (3) switch for main induction motor, 4,000-hp., 6,600-v. All three switches are protected by oil circuit breakers and are automatically locked out by interlocks connected to the oil circuit system. In addition, main motor is protected by under-voltage release and by overload current relays. To left of these three G.E. switch panels are four Trumbull switches for (in order, from right to left) 500-hp. cutter motor, 150-hp. winch motor, and two G.E. 75-hp. induction motors driving Allis-Chalmers 6-in. centrifugal service pumps.



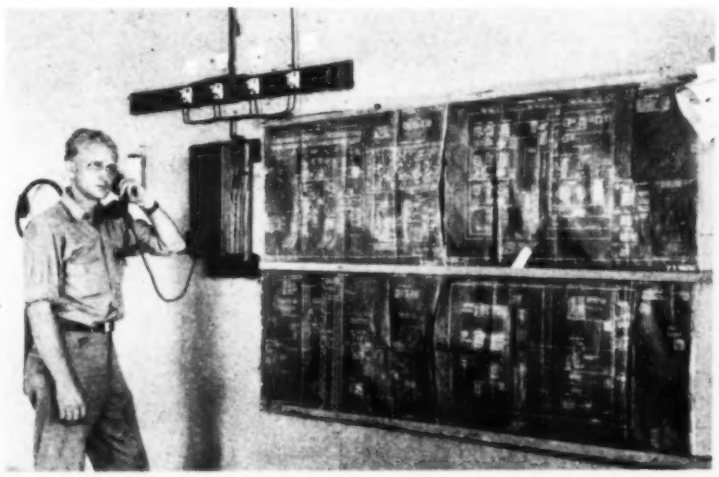
NIGHT ILLUMINATION by floodlight towers and by strings of floodlamps on Kingsley dam facilitates 24-hr. operations seven days a week.



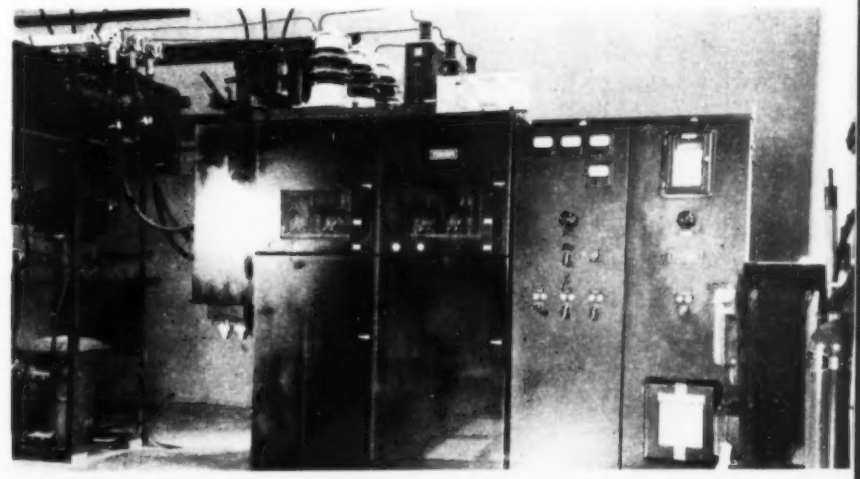
DRIVING CUTTER SHAFT THROUGH INCLOSED REDUCTION GEAR with flexible coupling between motor and pinion shaft is G.E. 500-hp. 2,300-v. induction motor mounted on ladder frame above hinge bracket in well at bow of dredge. Light sheet steel house with louvres protects motor from weather. Maximum cutter speed is about 17 r.p.m.; motor is provided with non-reversing control and resistance by means of which it may be operated continuously at minimum cutter speed of 12 r.p.m. Structural steel ladder is about 70 ft. long from center of hull suspension to inside of cutter head. Cutter head, about 8 ft. in diameter by 7 ft. 3 in. in length, consisting of eight heavy spiral blades, is driven through shaft with minimum diameter of 10 in. and with a 13½-in.-diameter lower section. Cutter blades are protected by replaceable nickel chrome molybdenum cutting knives.



HOISTING EQUIPMENT FOR TUNNEL SHAFTS on Gobbler's Knob at south abutment takes power at 440-v. from one of three Westinghouse 10-kw. transformers (in circle, at right) which also reduce 6,900-v. power to 220-v. and 110-v. for tunnel work in this abutment, where contractor is building concrete curtain wall in successive 5-ft. tunnel lifts in preference to making open cut 190 ft. deep. Two shafts, one of which is shown, serve tunnel from this level. G.E. 25-hp. motor operated by G.E. switch box and push button control drives hoist (in circle, at left) which raises muck bucket from tunnel to head-frame and, after completion of 5-ft. lift in tunnel, pulls loaded drag bucket to shaft to drop earth into tunnel for backfilling around wall. Second shaft, not shown, has 30-hp. hoist to perform similar muck-hoisting and drag-scraper operations.

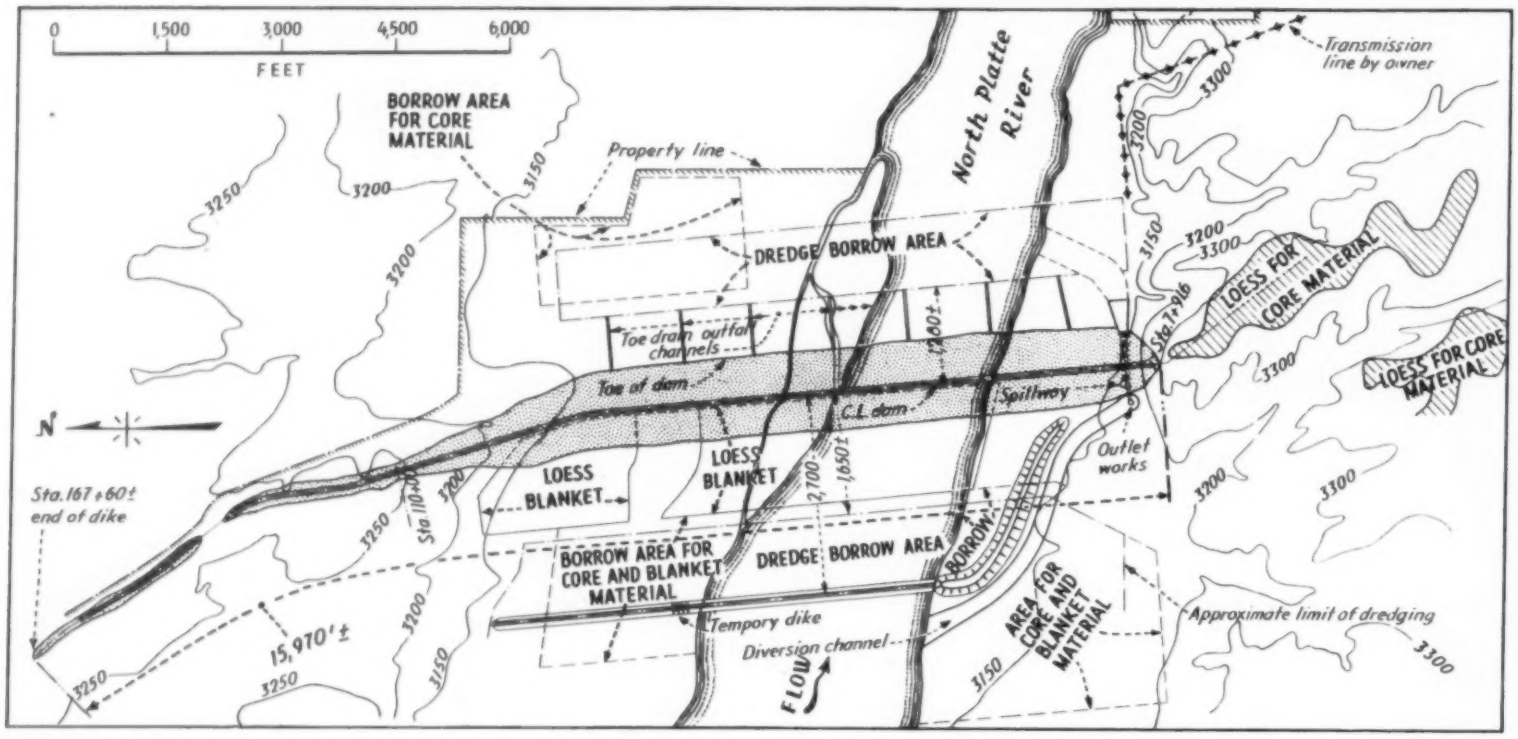


WIRING DIAGRAMS FOR SYNCHRONOUS CONDENSER and control apparatus are tacked to wall alongside telephone at which George W. Campbell, substation operator for Minneapolis Dredging Co.-Martin Wunderlich Co., is making call.

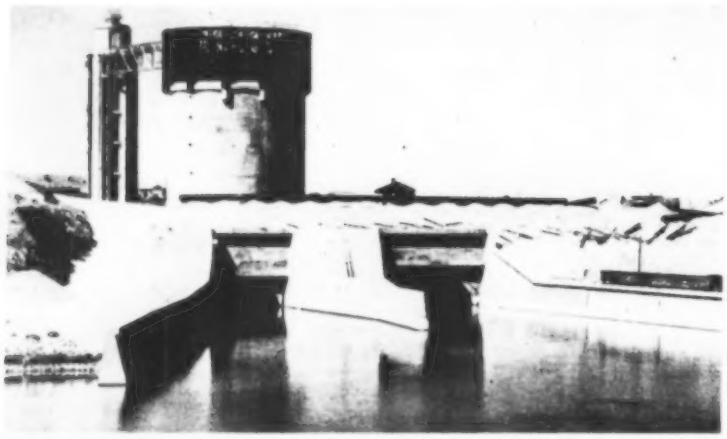


SWITCHGEAR APPARATUS contains voltage regulator which automatically controls switches of field rheostat, and these switches in turn add or subtract resistance in shunt field of shunt-wound exciter motor, thus controlling voltage of synchronous condenser.

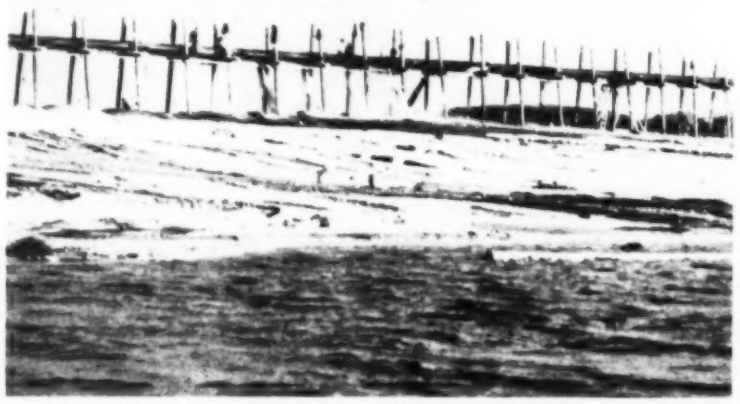
Electric Power AT KINGSLEY DAM (continued)



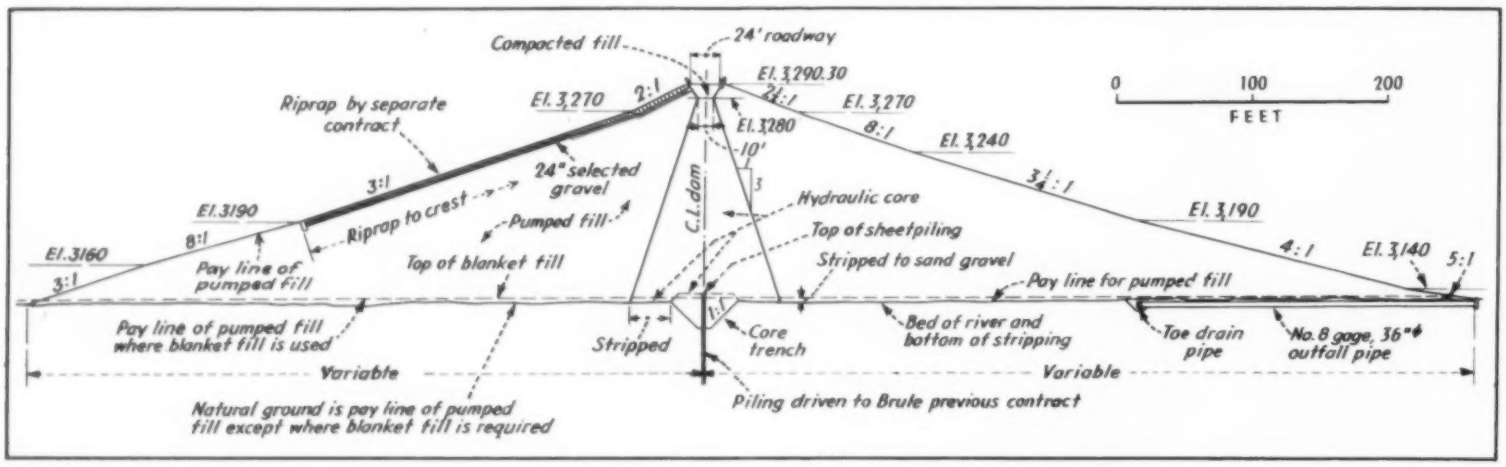
26,000,000 CU.YD. OF HYDRAULIC FILL in Kingsley Dam is being placed by two 30-in. electric dredges and by auxiliary equipment which sluices loess material from south abutment into core. Two floating electrically powered 18-in. centrifugal pumps in core pool pump water to top of south abutment, where necessary additional core material is dumped by scrapers into metal sluice box and pressure-jetted by sprays for pumping to core pool by one electric-motor-driven 18-in. centrifugal pump. Sta. 110+00 marks division between hydraulic fill and compacted embankment.



LARGE MORNING-GLORY SPILLWAY and outlet control tower are completed well in advance of hydraulic fill. River diversion during construction of embankment is carried through 28½-ft. spillway conduit, at right, extended for this purpose short distance upstream beyond morning-glory spillway, 101 ft. in diameter.



SPILL POCKETS OF 30-IN. BEACH PIPE supported on two-pole bents discharge dredged fill material at top of dike, whence material flows toward core pool in foreground. Beach pipe has ¼-in. wall thickness and comes in 25-ft. lengths with ball and cone ends which are coupled with turnbuckle fastenings.



TYPICAL SECTION OF KINGSLEY DAM. Hydraulic fill embankment is being pumped into place to maximum height exceeding 160 ft. above steel sheetpile cutoff wall driven to dense Brule clay under previous contract. Upstream face of dam above El. 3,190 will be protected by riprap of precast concrete units held in position by wrought-iron locking bars. Riprap is being manufactured and installed under separate contract. Relocated state highway crosses crest of dam.

Electric Hammer Vibrator FACILITATES CONCRETE PLACEMENT IN STEEL-FRAME BUILDING

WORKING GRAVEL CONCRETE into narrow opening under steel girder, electric hammer equipped with extended rod vibrates beam bottom form.

AN IMPROVISED VIBRATOR, made up by attaching a length of steel rod to an electric hammer, agitates steel-pan and wooden forms for T-beam floor slabs and girder fireproofing in the State Department of Justice building, Raleigh, N. C., where the J. J. McDevitt Co., Charlotte, N. C., is erecting its second granite-faced steel frame structure in 2 years. After completing a State Office building in December at the northwest corner of Capitol Square, the contractor moved to the south side of the square and started work on the present $500,000 contract about the first of the year. Served by a 10S mixer and an electric hoist operating a ½-yd. bucket in guides anchored to the steel frame of the building's permanent elevator shaft, the concrete crew places 80 cu.yd. in an 8-hr. day.

Measuring 210x56 ft. in plan and containing five stories above the basement, the building requires 420 tons of structural steel (fabricated by the Ingalls Iron Works, Birmingham, Ala., at its Verona, Pa., plant and erected under subcontract by John Coe, Charlotte, N. C.) and nearly 4,000 cu.yd. of concrete, in addition to Mt. Airy, N. C., granite facing, backup brick and other materials. Exterior walls are 12 in. thick, with granite in 4-in., 8-in. and 12-in. thicknesses interlocking with the backup brick.

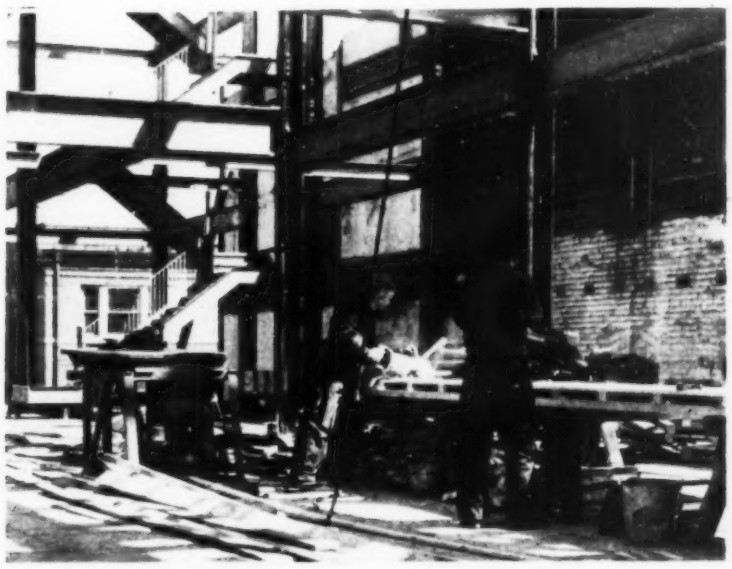
IN CHARGE OF JOB for J. J. McDevitt Co., general contractor, Charlotte, N. C., is O. A. GILLAM, who has supervised work for this company since 1922.

Columns rest on spread footings on clay. Concrete for floors and fireproofing contains 5.4 sacks of cement per yard and is made with small gravel, ½ in. and smaller, to permit working the mixture into the 1⅞-in. space between beam soffit forms and girder flanges. A two-drum electric hoist operates the concrete bucket. Wheelbarrows distributed concrete from the mixer on the first floor, but a floor hopper and carts are being used above this level.

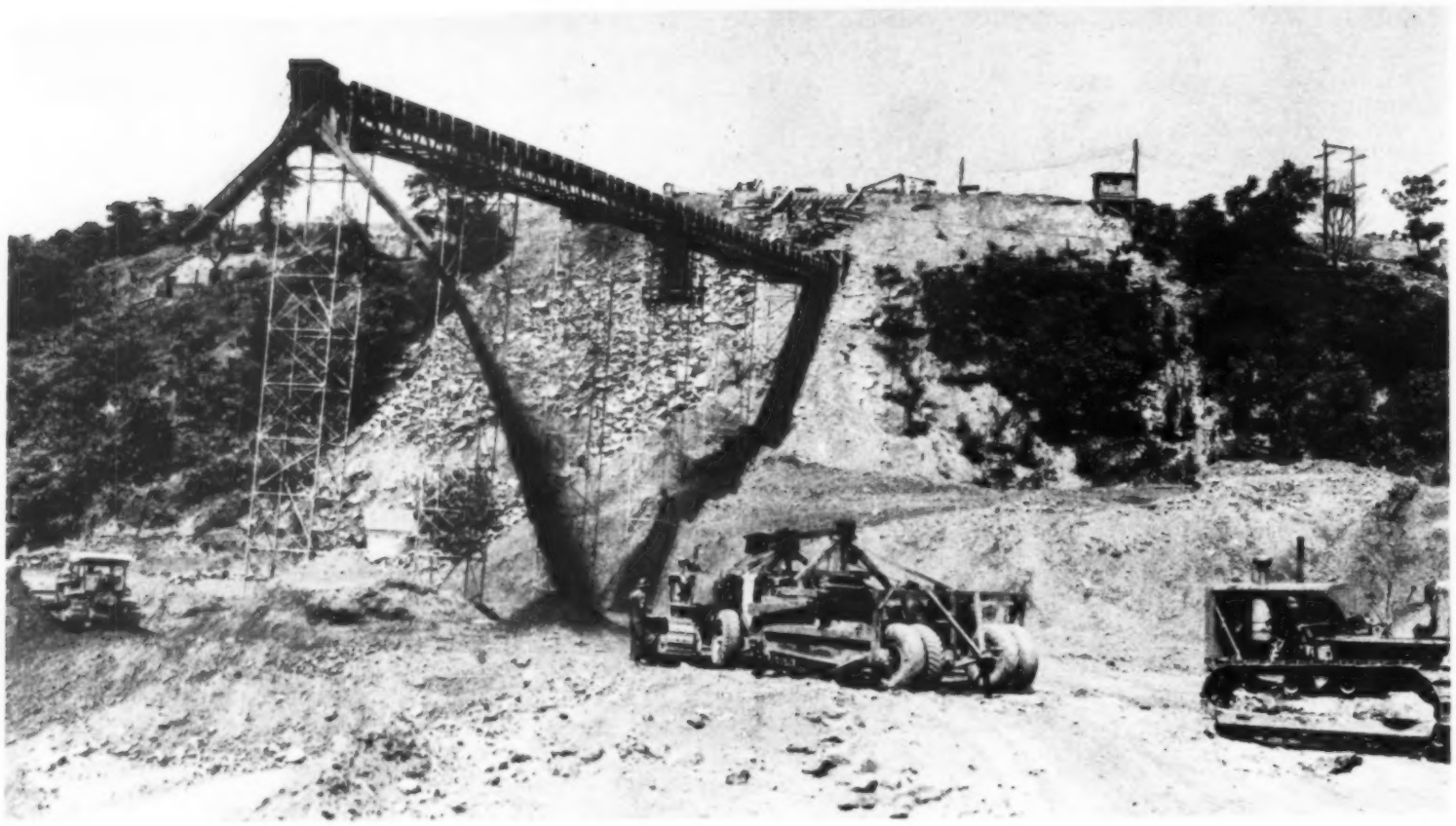
Sufficient steel pans are in use to form an entire floor. The floors are poured in sections of about 80 cu.yd. In addition to the pans, the first floor required about 50,000 b.-ft. of lumber for forms and shores. Operating the electric hammer against the pans and wooden forms causes the concrete to flow around the structural steel and reinforcing bars. Columns are fireproofed with tile between floor and ceiling.

Construction will be completed in December. O. A. Gillam, who has directed work for the J. J. McDevitt Co., Charlotte, N. C., general contractor, for the last 17 years, is in charge of the job.

STEEL-PAN FORMS rest on shored wooden strips into which ceiling hangers have been driven after erection. Reinforcing bars come to job already bent.



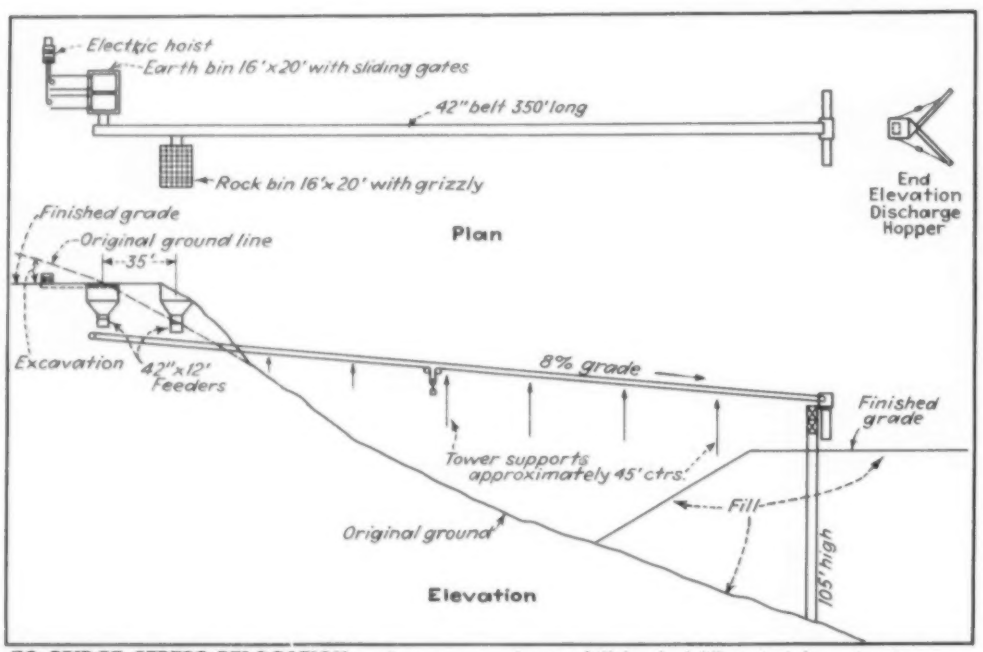
ELECTRIC HAND SAW and gasoline-powered table saw assist two carpenters in cutting form lumber.



BULLDOZERS AND SCRAPERS working on muck piles deposited by discharge spouts distribute material in 6-in. loose layers for compacting by tamping roller. Sloping grizzly over rock bin at top of bank rejects oversize pieces, which roll to foot of slope for rehandling by shovel.

Tall Conveyor Bridge

TRANSPORTS HILLTOP EXCAVATION TO VALLEY FILL



TO BRIDGE STREET RELOCATION and save secondary uphill haul of fill material, contractor supports 350-ft. belt conveyor on tall tubular towers over intermediate depressed street grade.

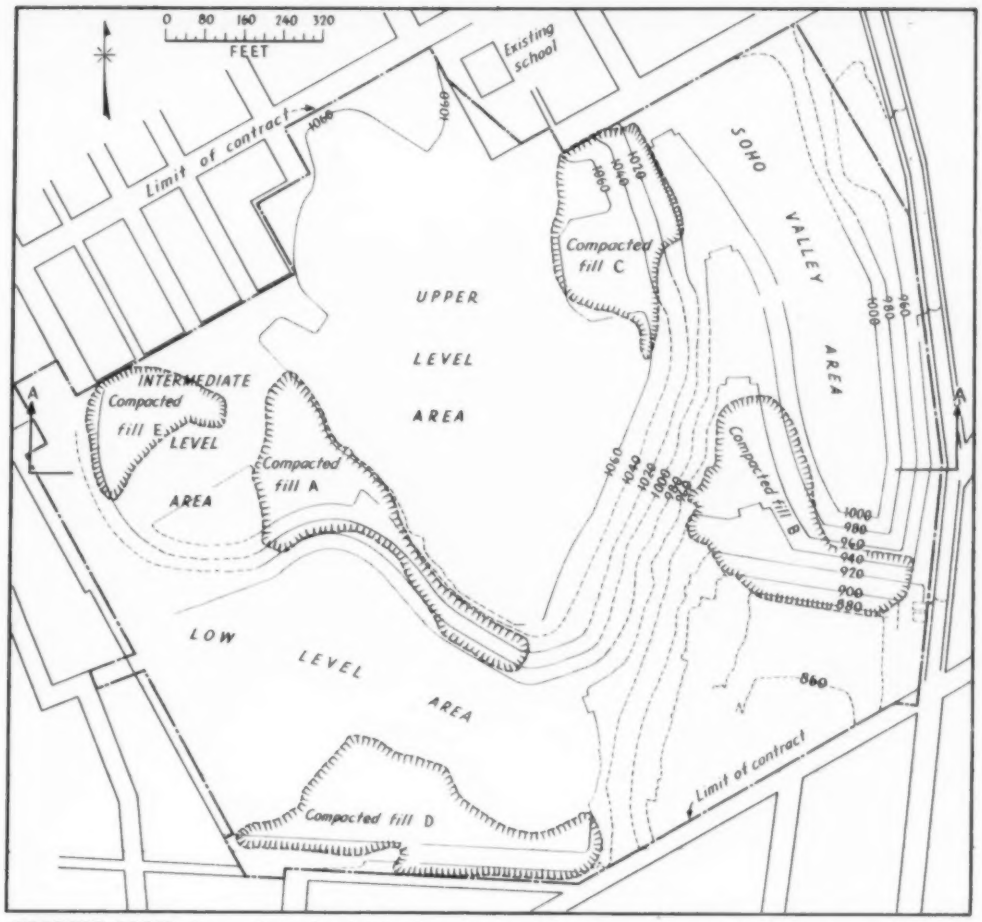
AN UNUSUAL COMBINATION of excavating and conveying equipment has moved 840,000 cu.yd. of earth and rock for the Harrison Construction Co., Pittsburgh, Pa., in grading the 40-acre site of the Pittsburgh Housing Authority's Terrace Village No. 1. Power shovels, tractor-wagon units, trucks, and tractor-drawn scrapers with heaped-load capacities up to 30 cu.yd. have scalped a hilltop to a maximum depth of 60 ft. The bulk of the material sliced off the hill has gone into a heavy fill at the foot of a steep bank which drops precipitously from the excavated area into a deep valley at much lower elevation. A depressed grade for a relocated street separates the steep hillside from the fill. To eliminate the double cost of dumping spoil into this depression and then raising it on to the fill, the contractor bridged the street location with a 350-ft. conveyor supported on tall tubular towers. The conveyor extended from hoppers sunk into the hillside at finished grade to a discharge point above the final elevation of the fill.

Rugged Site — To obtain cheap land for low-rent housing near the center of the city, the Pittsburgh Housing Authority is developing large tracts in the Hill District between the Allegheny and Monongahela rivers. The sites are rough and hilly, requiring heavy volumes of earth-moving to bench the knobby peaks for large-scale housing.

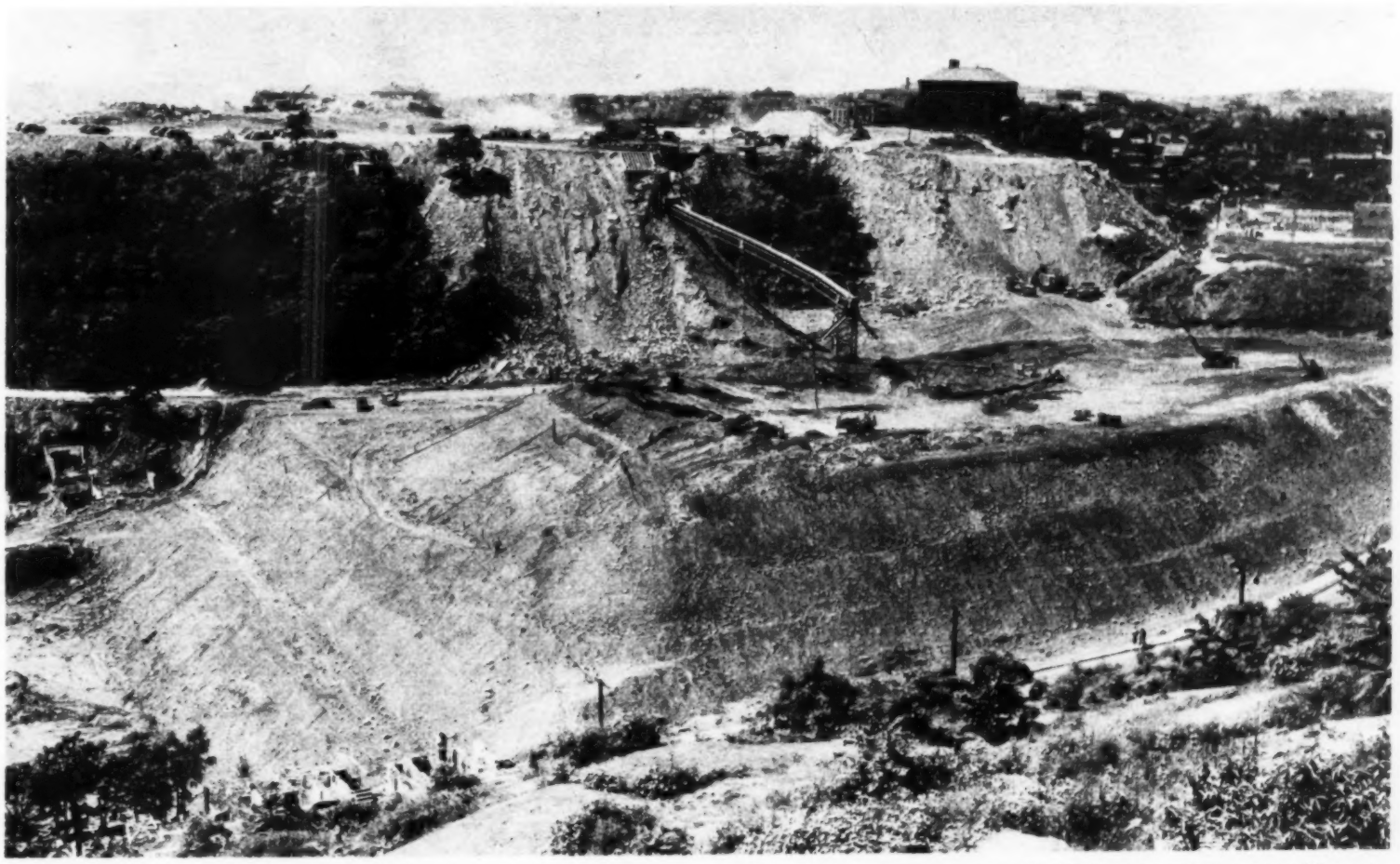
Terrace Village No. 1 will provide

dwelling units for 804 families in groups of houses on three levels of Ruch's Hill, as shown in an accompanying grading plan. This plan, in combination with a grading section, likewise reproduced with these notes, indicates the character of the earth-moving problem. The grading section shows also the bottom of a coal seam, partially mined and burning over large areas, which complicated excavation and hauling on the hill. Heat from the burning vein may have started fractures of overlying rock seams, as the contractor was able to break about 50,000 cu.yd. of sandstone in layers up to 16 ft. thick with 12,000 lb. of 40 per cent gelatin dynamite.

Excavated material from the hilltop was used to raise the level of an existing 60-ft. fill in the steep Soho Valley by adding 120 ft. to its height, thus creating a 12-acre playground area. To avert possible down-valley slides of the 180-ft. built-up fill, the plans called for two cross-section drainage trenches in the old fill before new material should be placed on it. These trenches were excavated by dragline to original ground on both sides of the valley, and lines of 10-in. perforated cast-iron pipe were laid in the bottoms, draining into an existing 5-ft. brick sewer. Slag fill was placed around the pipes in each location and up to the existing ground surface in a box trench 7 ft. wide built against the upstream bank of the open excavation, with a 1-ft. sand envelope for filtration



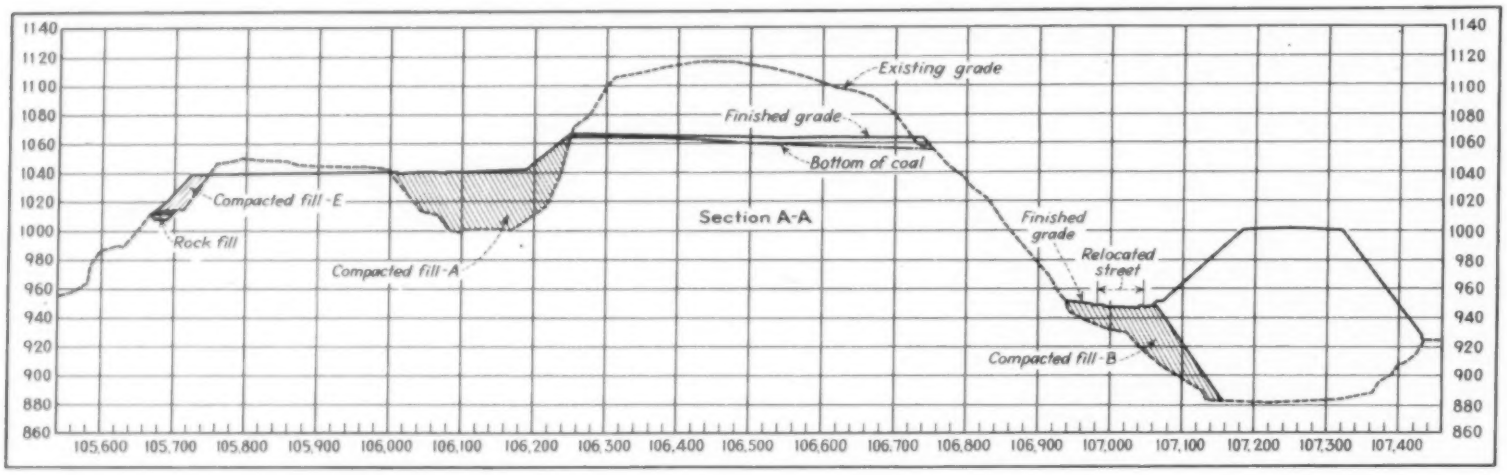
GRADING PLAN shows three levels for housing construction on terraced 40-acre site. Material from upper level area forms 600,000 yd. Soho Valley fill.



CONVEYOR BRIDGE 350 ft. long, supported by tall steel towers, transports material from hilltop excavation to build 120-ft. fill in valley, raising fill to elevation just 60 ft. below finished grade on hill.

ALL-DIESEL EQUIPMENT moves blasted rock out of hilltop cut as 2½-yd shovel loads 7-yd. truck powered by 75-hp. four-cylinder engine.

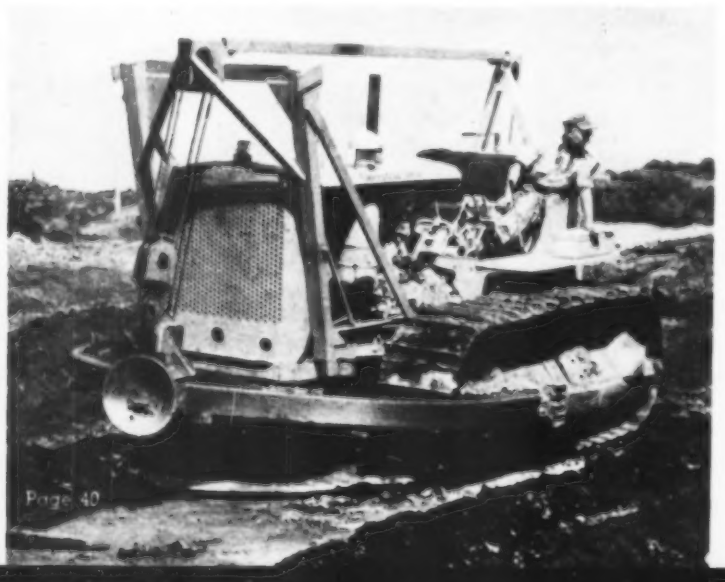
ROCK WAGONS side-dump 16-yd. loads on to sloping grizzly over rock bin. Electrically powered steel pan conveyors under rock bin and under earth bin feed materials to main conveyor.



DECAPITATING HILL to provide level housing area, contractor moves materialinto heavy valley fill at right, leaving intermediate hollow for relocated street. Sketch is drawn to distorted scale, with vertical scale exaggerated.

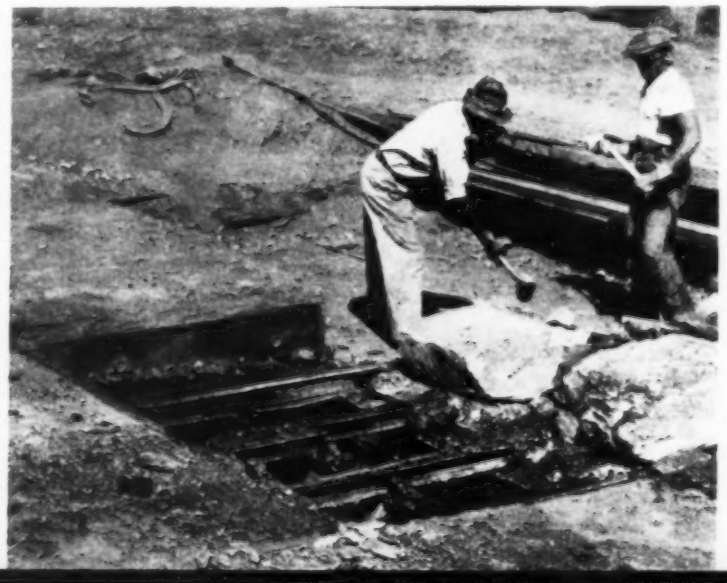
MANAGER OF OPERATIONS on this and other contracts for Harrison-Construction Co. is MARTIN W. WISE (right), general superintendent, who talks over job progress in early morning with J. B. KELLY, JR., assistant construction supervisor for architects. Behind two men is diesel-powered 320-c.f.m. compressor mounted on old truck by Tony Magnifesto, master mechanic.

PUSHER TRACTOR (below) carries special cup on bulldozer frame to facilitate contact with bumper projecting from rear end of scraper.



SPOTTED OVER EARTH BIN 30-yd. heaped-load scraper discharges material by positive cable-control ejection into open gate of hopper.

SLIDING GATES (below) over earth bin are closed and opened as required to permit spotting of equipment and dumping of loads. Occasional pieces of oversize rock caught by grillage are broken with hand sledges or steel skull-cracker operated by truck crane.



on both sides of the slag. The remainder of the open trench was backfilled with compacted fill material.

Excavation — Two classes of equipment excavated and hauled material on Ruch's Hill. Blasted sandstone and hard shale were dug and loaded into tractor-drawn 16-yd. crawler wagons and diesel-powered 7-yd. trucks by three diesel shovels, 2½- and 1¾-yd. size. This equipment also took out about half of the softer materials requiring no blasting. For the remainder of the unblasted shale, clay, slate and coal, the contractor operated a fleet of tractor-drawn scrapers having struck-measure capacities of 12 and 22 cu.yd. All hauling units — tractor-wagons, trucks and scrapers—dumped into hoppers feeding the main conveyor.

Working two 8-hr. shifts, or 16 hr. a day, the excavating plant averaged 10,000 cu.yd. a day and moved a maximum of 12,500 yd. When operating at this capacity, the working plant included a Koehring 2½-yd. diesel shovel, a Koehring 1¾-yd. diesel, a Lorain 1¾-yd. diesel, four Athey 16-yd. two-way-dump wagons drawn by Caterpillar 97-hp. diesel tractors, three Sterling 7-yd. trucks powered by Cummins 75-hp. four-cylinder diesel engines, two 30-yd. heaped-measure Le Tourneau scrapers pulled by Caterpillar 97-hp. low-gear diesel tractors, two Le Tourneau 12-yd. struck-measure scrapers hooked up in tandem behind a third 97-hp. low-gear tractor and three Le Tourneau 12-yd. units operated singly by Caterpillar diesel 97-hp. standard-gear tractors. A fourth 97-hp. low-gear Caterpillar equipped with a pushdozer cup on a Le Tourneau bulldozer frame pushed the 30-yd. scrapers and the tandem 12-yd. units when loading. This portion of the job plant required eleven 97-hp. tractors.

Not all of the earth-moving equip-

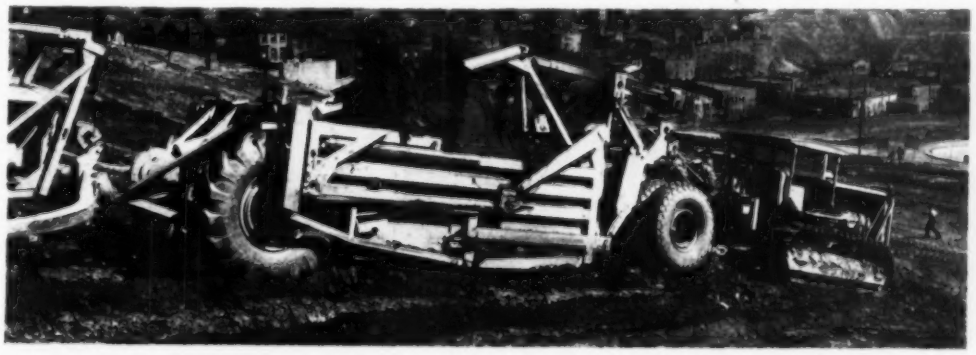
(Continued on page 80)

Walt F. Denfeld Photo

WORKING 24 HR. A DAY. one wagon drill supplied with air from truck-mounted compressor keeps ahead of three shovels. To save trouble in handling material, contractor, after stripping overburden, drills and blasts everything above coal seam.

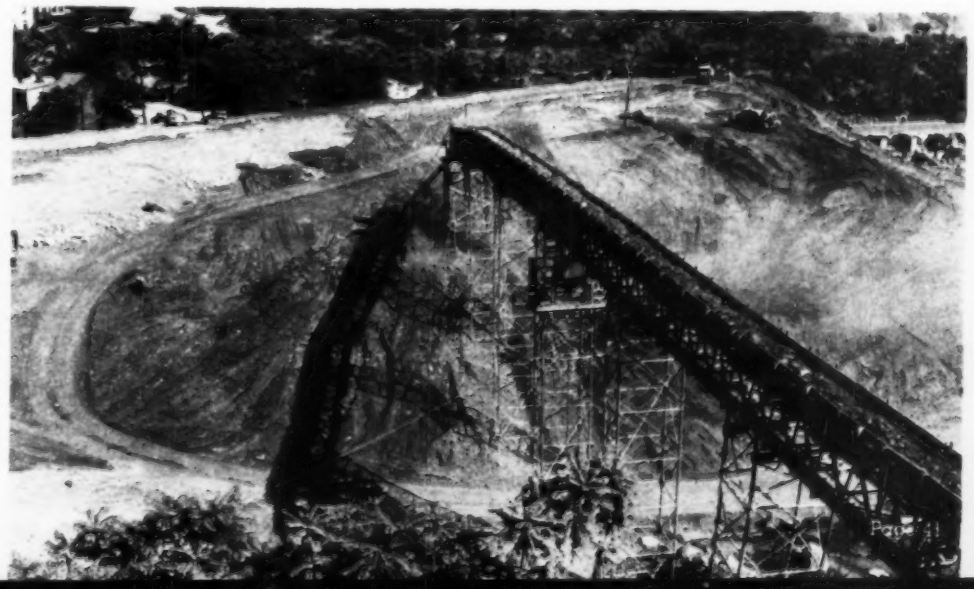
WHILE GRADING CONTINUES on hilltop, A. Smith & Co., Chicago, start foundation excavation on lower level for first houses to be erected under $2,000,000 contract involving 804 dwelling units in Terrace Village No. 1. In background are Monongahela River and steel mills

DOUBLE-DRUM ELECTRIC HOIST in shed at left operates sliding gates by continuous lines wrapped around two drums. One gate is open to permit dumping by scraper at right



PAIR OF LOW-GEAR 97-HP. DIESEL TRACTORS put 30-yd. load in scraper stripping coal seam below finished grade preparatory to backfilling with earth. In earth and rooted rock on this job, each of big scrapers averages 26 cu.yd. loose load and moves about 1,000 pay yards in 8 hr. on 650-ft. average one-way haul.

BRIDGING DEPRESSED AREA (below) for future street location, 42-in. belt conveyor traveling 250 ft. per minute carries 500 to 700 cu.yd. per hour of earth and rock from hilltop to two-way discharge spouts above deep fill.



Construction Activities IN WAR ZONE

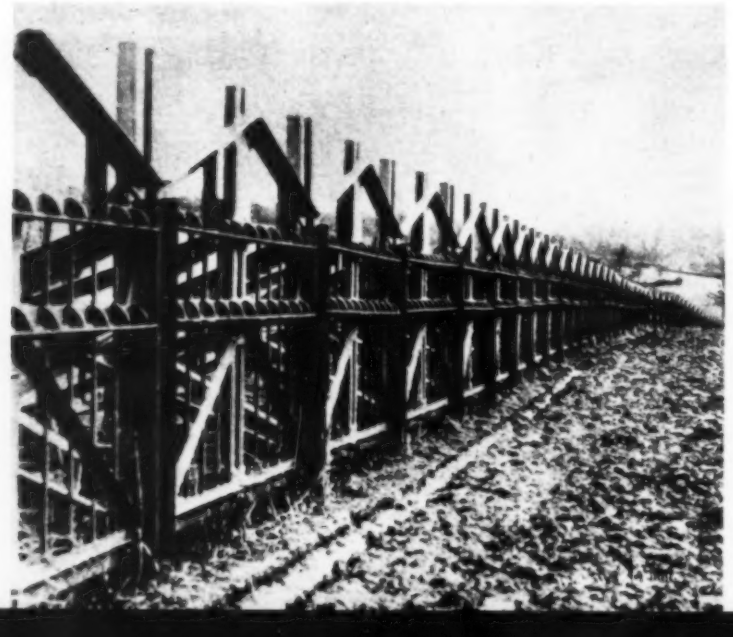
GERMAN CONSTRUCTION CREW IN POLAND starts work on temporary bridge across Bzura River at Sochatschew to replace steel truss structure, in background, which Poles had blown up during retreat following German army invasion.

PONTOON BRIDGE is erected by German forces near Bromberg, following Nazi advance into Poland. Construction of 1,180-ft. river crossing is said to have been completed in two days.

AIR RAID PRECAUTIONS in London involve installation of emergency flood gate in Waterloo station of Northern underground line to prevent inundation of tube by water from River Thames in event of damage by bombing.

REMOVAL OF DEBRIS at end of Dirschauer bridge, destroyed by Poles as German army advanced, is done with aid of hopper cars operating on industrial railway. In background is new temporary bridge erected to restore railroad traffic across river.

MODERN CHINESE WALL of structural steel members is erected along Belgian frontier to resist possible invasion by German forces. Fence consists of units mounted on rollers and is designed particularly to check advances of enemy tanks.



LOADING OF BULK CEMENT at Ford plant is done by chute delivering into trailers with special watertight metal bodies holding 80 bbl.

Bulk Cement HAULED TO PAVING JOB IN Special Trailers

LARGE CAPACITY BULK-CEMENT TRAILERS of a new type constituted an important feature of the contractor's equipment employed in paving with concrete a 5.1-mi. section of U.S. 12, west of Ann Arbor, Mich., a three-lane highway 33 ft. wide, with 8-ft. stabilized shoulders on each side. The slab thickness is 10 in. for the outside lanes carrying most of the traffic, and 8 in. for the center lane.

Participating in the project were the Ford Motor Co., of Dearborn, which supplied the portland cement, the George F. Alger Co., trucking contractor, and Frank J. Knight, road-building contractor, both of Detroit.

Bulk-Cement Trailers

The Ford Company arranged special facilities for loading bulk cement into the new type trailers designed and built by the Alger company, while the Knight organization installed a new type automatic bin for handling the cement in bulk at the receiving end.

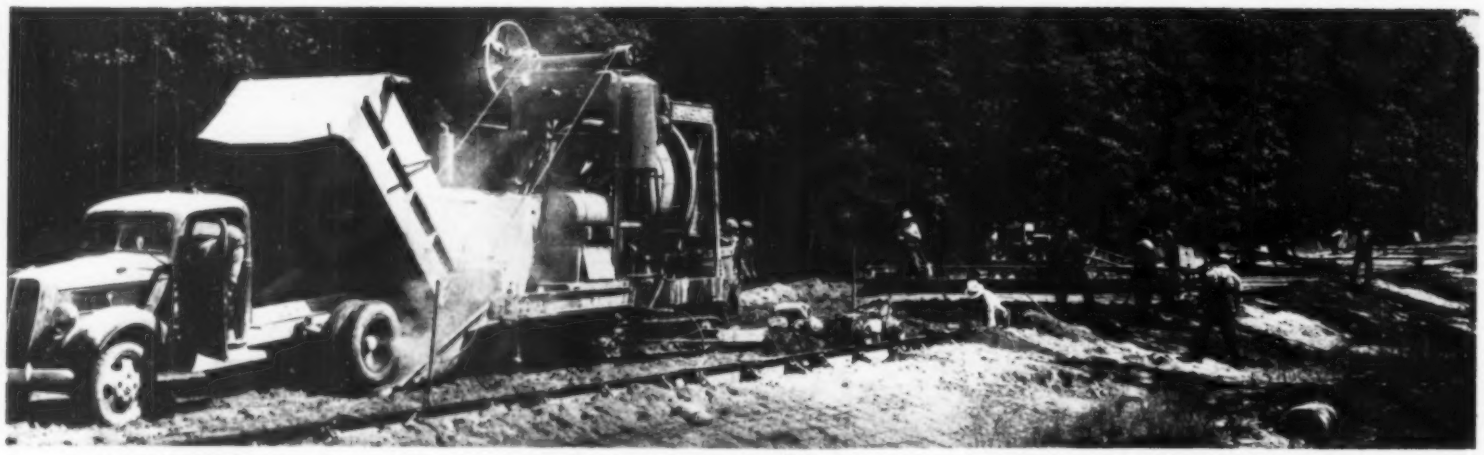
Each trailer body is constructed of sheet steel with steel channels reinforcing the sides and ends. Three worms driven by a gasoline engine mounted externally at the front extend the length of the body. When in operation they move the cement to the discharging chute at the rear. The worms may be operated individually or together, an important feature since it permits control of the speed at which cement is unloaded. Two of the trailers, a semi-trailer and four-wheel trailer, make up a train, usually pulled by a large diesel tractor truck. Since each trailer has a capacity of 80 bbl. of cement, a train transports a total of 160 bbl. per trip.

Loading and Unloading

The construction crew required approximately 750 bbl. of cement a day. Three trains shuttling back and forth between the cement plant and the scene of action easily supplied this amount. The cement trailers passed under special chutes at the Ford cement plant and received their loads in a few minutes. At the construction site the driver uncoupled the four-wheel trailer and backed the semi-trailer up to the automatic receiving bin.

The driver dropped the trailer chute into the receiving bin and discharged about 10 per cent of his load by gravity. Then he started the auxiliary engine on the front of the trailer and the worms discharged the rest of the load. Meanwhile, an auxiliary tractor truck backed the four-wheel trailer into position on the opposite side of the receiving bin.

DUMPING OF CEMENT into hopper, for elevation to steel bin, is aided by worm screws in trailer body. In rear, Ford batch truck is receiving charge of cement for delivery to paving mixer.



PAVING MIXER makes two passes over 5-mi. length of project, pouring 22-ft. wide slab on outward trip and 11-ft. wide slab on return.

This trailer was likewise equipped with worms and an auxiliary engine and was unloaded in the same manner as the semi-trailer. The plan effected a substantial saving to the Frank J. Knight company, according to Frank Manley, superintendent in charge of construction. A part of this saving resulted from the absence of cement sacks.

Cement is completely protected with the equipment now in use on the job. It is loaded under cover, transported in rainproof and windproof trailers and stored in a rainproof hopper on top of the automatic receiving bin. There was little loss from blowing and never any rush for canvas and tarpaulins when rain fell on this job.

Vacuum-Processed Concrete COMPLETES ABUTMENT FACING IN ONE DAY

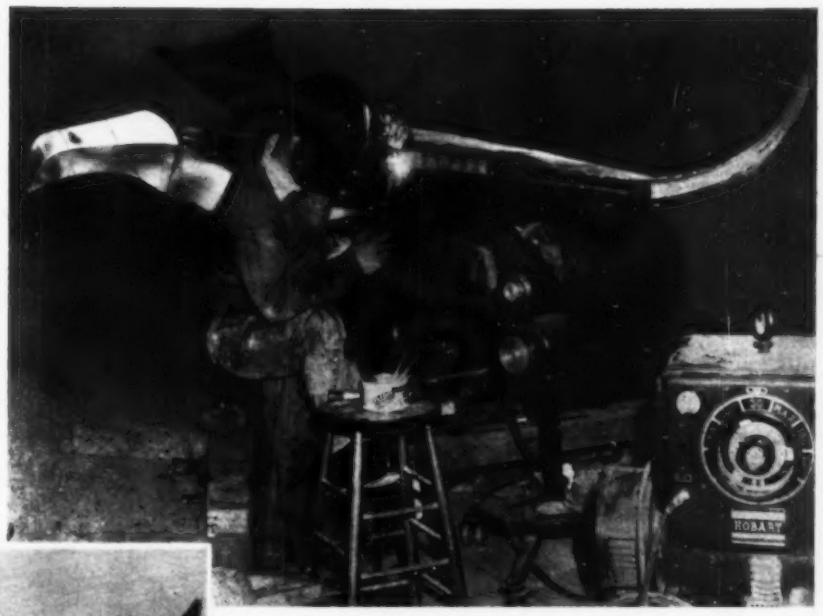
OPEN JOINTS OF OLD STONE ABUTMENT permit thorough penetration of grout when concrete facing is applied.

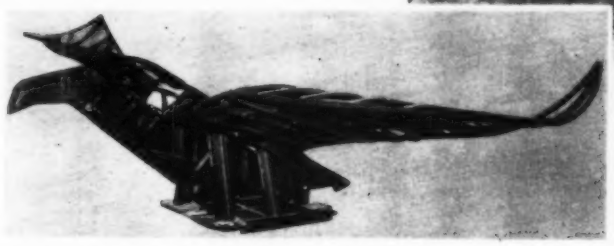
ONE-DAY JOB with vacuum-processed concrete covers stone masonry with 6-in. protective facing of 1:3 mixture.

ONE DAY'S WORK with vacuumized concrete was sufficient to complete 6-in. facing of an old redstone abutment of the Muddy River bridge, North Haven, Conn., by C. W. Blakeslee & Sons, contractors, New Haven, Conn. Employing the process and equipment of the Vacuum Concrete Corp., New York City, the contractor's crew placed 8 cu. yd. of 1:3 concrete in the 6-in. face and removed excess water to assure prompt finishing and early strength development. The work was performed in an all-day rain.

Plywood vacuum mats were set about 6 in. from the stone surface to serve as forms. As the mats were filled in 4-ft. lifts, the vacuum was turned on and the concrete hardened, the mats being removed in about 20 min. Red metallic floor hardener was rubbed into the concrete, which had not taken its initial set, to match the color of the stone.

JOB oddities

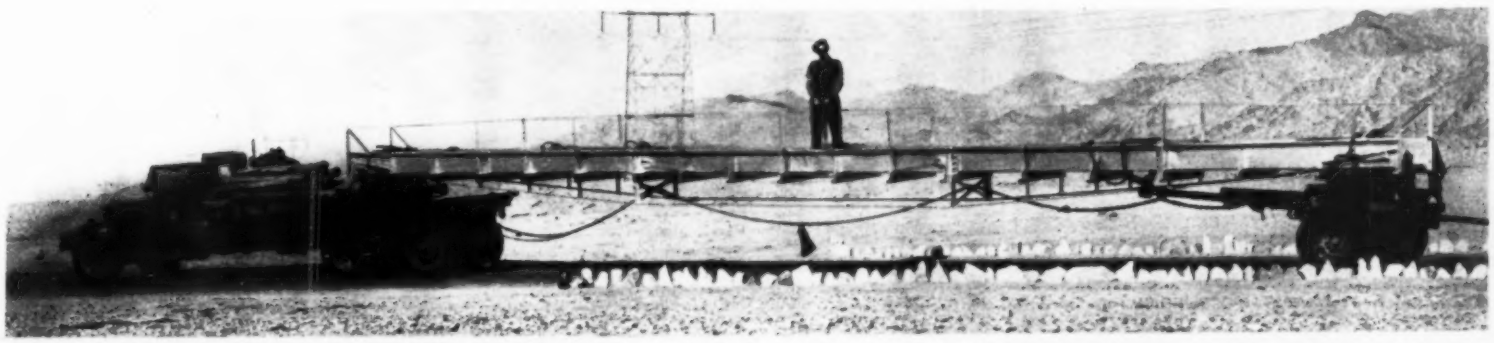




EAGLE OF STAINLESS STEEL is fabricated by arc-welding to serve as decoration atop Administration Building at New York City's newly completed airport at North Beach, Long Island. Bird has wing spread of 20 ft. and beak-to-tail length of 8 ft. Using 150-amp. Hobart welder Beck Studio applied 330 lb. of 22-gage stainless steel sheathing to 1,450-lb. frame of structural steel **(inset)**, including 4-in. channels and 1x1x⅛-in. T-bars.

ON THE LONDON "FRONT." British "Tommies" inject touch of comedy into air raid precaution job of placing sand-bag to protect buildings by labeling results of their labors with signs reading "Eggfried Line (No Poachers)" and "Imaginot Line."

"CHRISTMAS TREE" OF WIRE ROPE is byproduct of tests of cable from shaft of large mining company. After each specimen of 1⅜-in. Hercules flattened strand rope had been tested for strength (averaging 173,562 lb. at breaking point) each strand was taken apart for internal inspection. One piece of cable was formed into "tree" to show condition of wires from center to circumference.



PORTABLE STEEL BRIDGE is used by Pittsburgh Steel Co. to convey materials across canal sections of Colorado River aqueduct in California during erection of fences along right of way. Metropolitan Water District has rebuilt structure to serve as permanent bridge across canal near Iron Mountain.

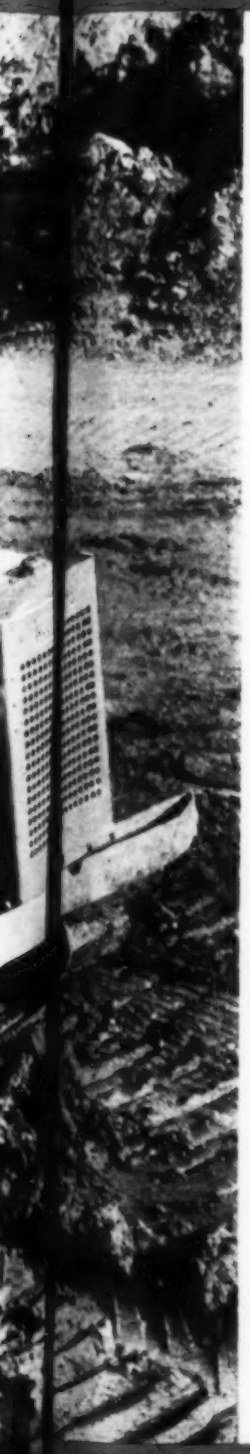
Less than a

. . . for Track Lubrication Bills with the

INSURANCE AGAINST TIME LOSSES—This new Positive-Seal truck wheel assembly keeps in lubricant, seals out dust, dirt, mud and grit. Result: Time losses for track repairs are practically nil.

Dime a Shift

New Positive-Seal Truck Wheel Assembly



Eliminate daily greasing and save yourself $706 or more per tractor! The new Positive-Seal idlers and truck wheels on Allis-Chalmers tractors *operate 200 hours on a single lubrication.* Here's what this money-making feature can mean to you:

Ordinary 80-95 H. P. tractors require 10 lbs. of grease for rollers and idlers plus 30 minutes greasing time, every shift. That's at least 10,000 lbs. and 500 non-productive hours for every 10,000-hour period. Cost of grease alone at 8c* is $800.

Compare "L" and "L-O" figures. Now you lubricate the front idlers and truck wheels *but once in 200 hours.* Only 3¾ gals. of lubricant at 50c per gal. are necessary...187½ gals. in 10,000 hours, costing only $93.75, and requiring but 25 lubricating hours. **Runs 10 to 12c in most states.*

Cost per hour for track lubricant is less than 1c! In addition, you gain 475 productive hours—more than two working months—on greasing time. Think of the profitable extra yardage you can move in that extra operating time.

Available on ALL Track-Type Models

The Positive-Seal truck wheel assembly —built to operate 200 hours on a single lubrication — is standard equipment on all Allis-Chalmers track-type tractors.

Step up profits... take advantage NOW of this great time and money-saving feature... pioneered by Allis-Chalmers and available only on A-C tractors. See for yourself ... on your own job ... what these *faster powered* tractors can do for you. Ask your Allis-Chalmers dealer to demonstrate.

ALLIS-CHALMERS POWER

TRACTOR DIVISION—MILWAUKEE, U.S.A.

TRACTORS, ENGINES, ROAD MACHINERY

...IT DOESN'T COST.. *it Pays!*

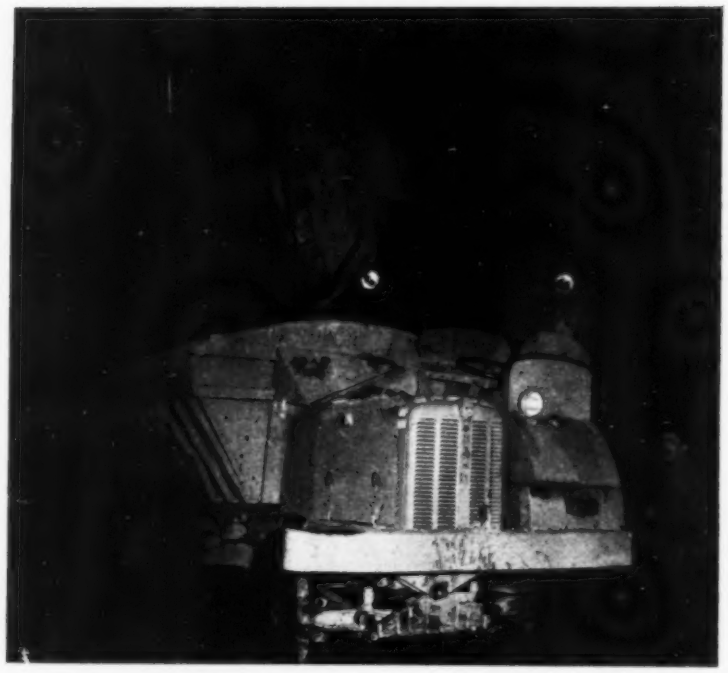
How They Did It

CONSTRUCTION DETAILS

For

Superintendents and Foremen

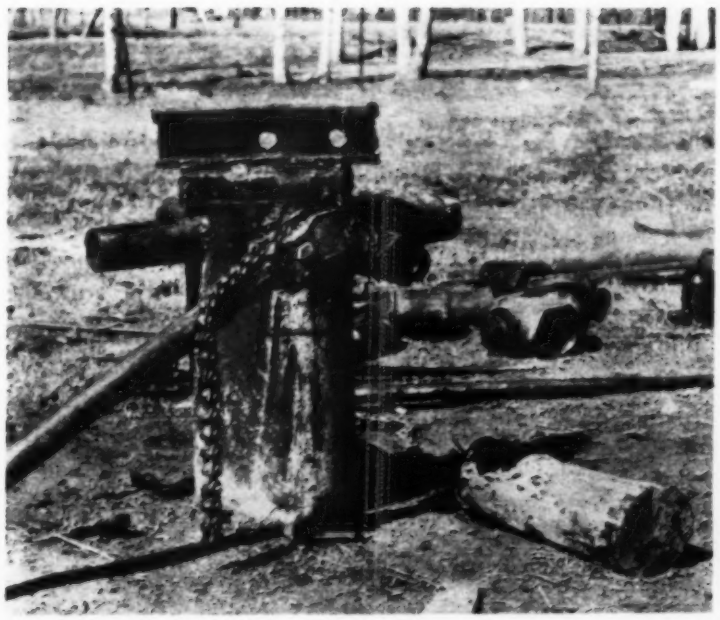
TRUCK-MIXER LOADING PLANT of Consumers Supply Co., Louisville, Ky. includes 18-ft.-diameter circular bin of composite type containing four separate compartments for aggregates (each holding 35 tons) and one for cement, with a capacity of 300-325 bbl. Aggregates delivered by truck into hopper are raised by inclined open bucket elevator which discharges into turnhead distributing aggregates to separate bin compartments. Cement is unloaded from hopper cars by vertical inclosed-type elevator. Plant feeds batches to fleet of 2½-cu.yd. Blaw-Knox truck-mixers. Composite aggregate and cement weighing batcher, with round discharge opening, loads truck-mixers directly. Water is provided by 125-gal. automatic volume measuring tank.



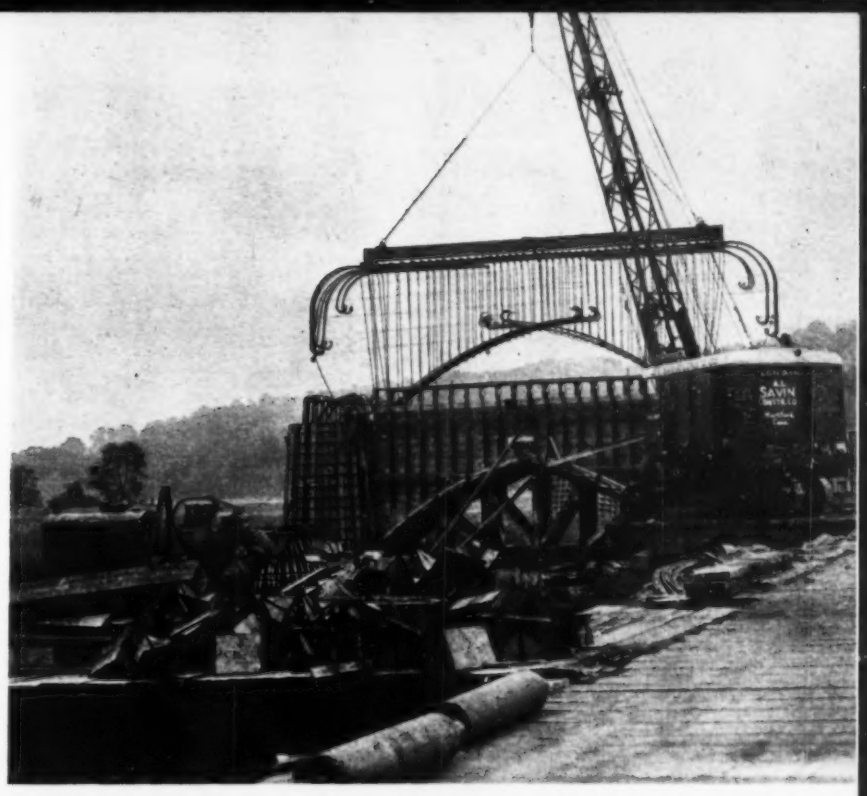
AGILE SHUTTLE TRUCKS, traveling with equal speed in either direction, and utilizing diesel power to minimize carbon monoxide content of exhaust gases, are outstanding tunnel haulage units on Pennsylvania Turnpike. Sammons-Robertson Co. and Boxley Bros., subcontractors in outer portals of twin tunnels (Blue and Kittatinny) for Bates & Rogers Construction Co., and Mason & Hanger Co. in Rays Hill tunnel show something new in speed and facility of muck removal with Koehring dumptors of 6-yd. heaped-load capacity powered by General Motors two-cycle four-cylinder 4¼x5-in. diesel engines equipped with electric starters.

WORLD'S LARGEST OVERCOAT (left) in form of mineral wool insulation blanket 1½ in. thick, is installed in outside walls of Parkchester, huge New York City housing project of Metropolitan Life Insurance Co. comprising 51 buildings. Insulation is estimated to reduce consumption of fuel oil for heating from 6,000,000 to 4,000,000 gal., equivalent to an annual saving of $42,000, according to R. H. Shreve, architect and chairman of board of design. Mineral wool insulation, backed by vapor-proofed paper, is thrust on pronged metal furring strips, ¾ in. deep, set on 16-in. centers and attached to solid brick outer walls. Expanded metal lath is also hung on these prongs, which are bent back, leaving wall ready for plastering. The firm of Starrett Bros. & Eken is general contractor on the project.

SCARIFIER ATTACHMENT (above) behind tractor-hauled scraper aids California Division of Highways in working rocky formations to produce rounded top slopes along highway cuts, as part of program of roadside development.

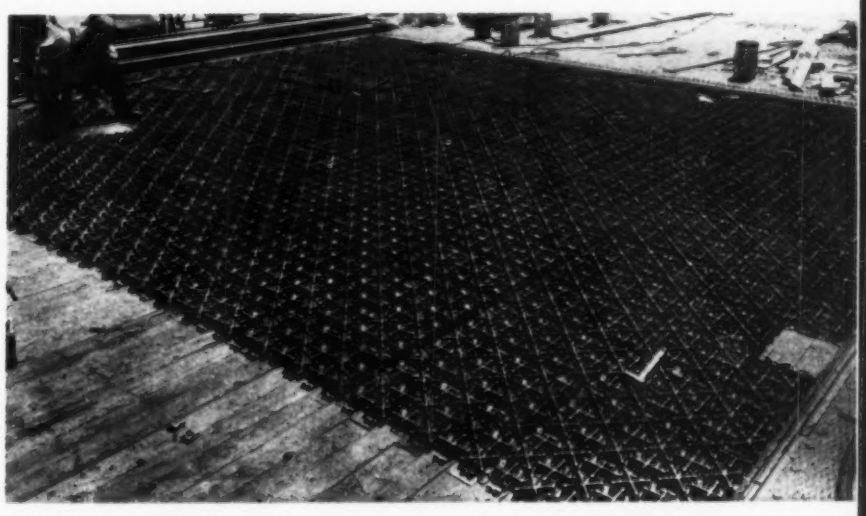


PIPE MAKEUP STAND, fabricated from nipples of various sizes welded to heavy pipe standard, facilitates assembly of valves and fittings and their breakdown when returned to stock. Stand consists of 10-in. pipe embedded in ground. At top are welded short threaded nipples of pipe sizes used on job. To these proper size pieces are threaded and desired fittings added one by one. Backup is provided by chain tongs.



ASSEMBLED SECTIONS OF STEEL REINFORCEMENT for Housatonic River bridge on Merritt Parkway in Connecticut are set in place as unit by Lorain crawler crane, operated by A. I. Savin Construction Co., of Hartford, Conn.

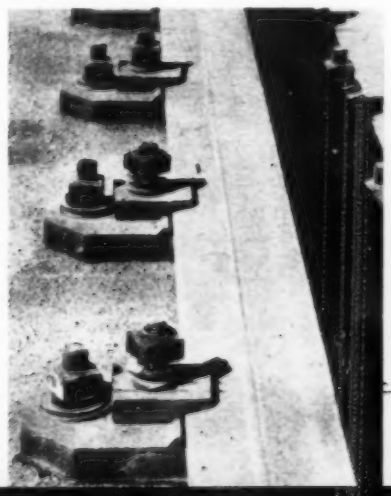
JOB-FABRICATED JOIST UNITS support floor forms on $1,100,000 contract of Ring Construction Co., Minneapolis, for Bedford Dwellings of Pittsburgh Housing Authority.

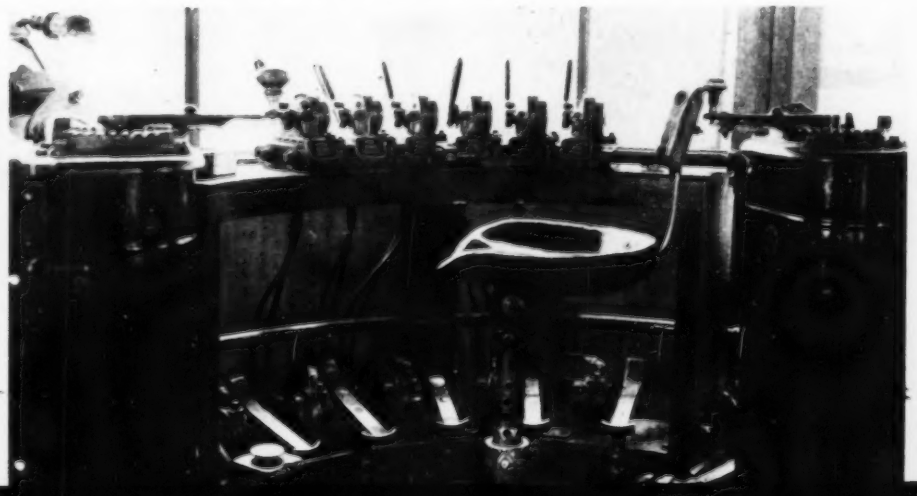


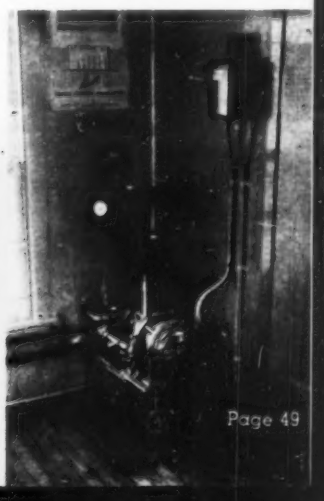
CAST-IRON GRIDS, filled with concrete, form roadways at ends of newly redecked Michigan Ave. bascule bridge, Chicago. They are installed by City's Department of Public Works for lengths of 35 ft. at points where heavy buses, stopped by traffic lights, cause excessive roadway wear. The monogrids, as they are called, consist of cast-iron crosses cast around ¼-in. reinforcing rods, all welded to steel strips in panels 15x20 in. The concrete-filled grids are 1¼ in. deep and are spiked through holes in lugs to timber bridge deck.

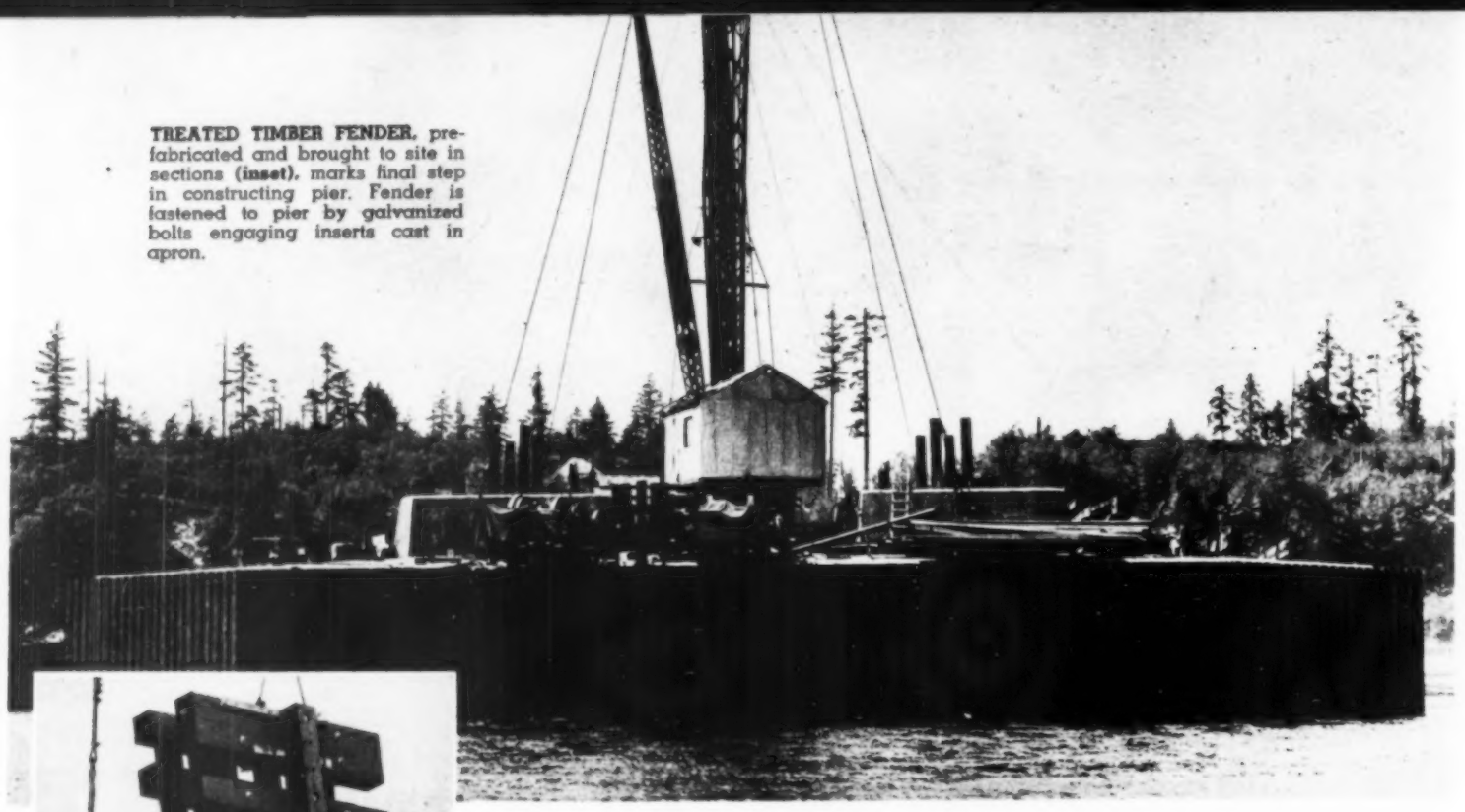
DETAIL OF RAIL FASTENINGS (below) used by Canadian National Railways to anchor track to concrete bridge decks without use of ballast and ties. To double-shouldered rail plate, 1¼ in. thick, rails are attached by clips and upstanding 1-in. round bolts with heads countersunk into bottom of plate. Spring washer is placed between bolt and nut. Anchor bolts are embedded 11 in. in concrete deck.

OVERHEAD PILOT HOUSE (below, left) on dredge at Kingsley dam, Nebraska, provides operator's seat back of manifold fitted with small hand levers (with foot treadles immediately below) for operating brakes and clutches of main winch. To left and right of manifold are G.E. drum controls for winch and cutter motors. Five winch drums are driven from single G.E. 150-hp. 440-v. induction motor connected through Falk speed-reducer by pinion and spur gear reduction to lineshaft equipped with five frictions operated by hydraulic control from manifold. At bottom, left, of manifold is foot-pedal push button which operates vacuum release valve and replaces hand control. Five levers on manifold control (left to right): (1) port swing clutch, (2) starboard swing clutch, (3) ladder hoist clutch, (4) port spud clutch and (5) starboard spud clutch. **HYDRAULIC PRESSURE SYSTEM (below, right)** controlling winch frictions is operated at 250-lb. pressure by Viking oil pump driven by G.E. 1-hp. induction motor, 3-phase, 60-cycle, 220-440-v.







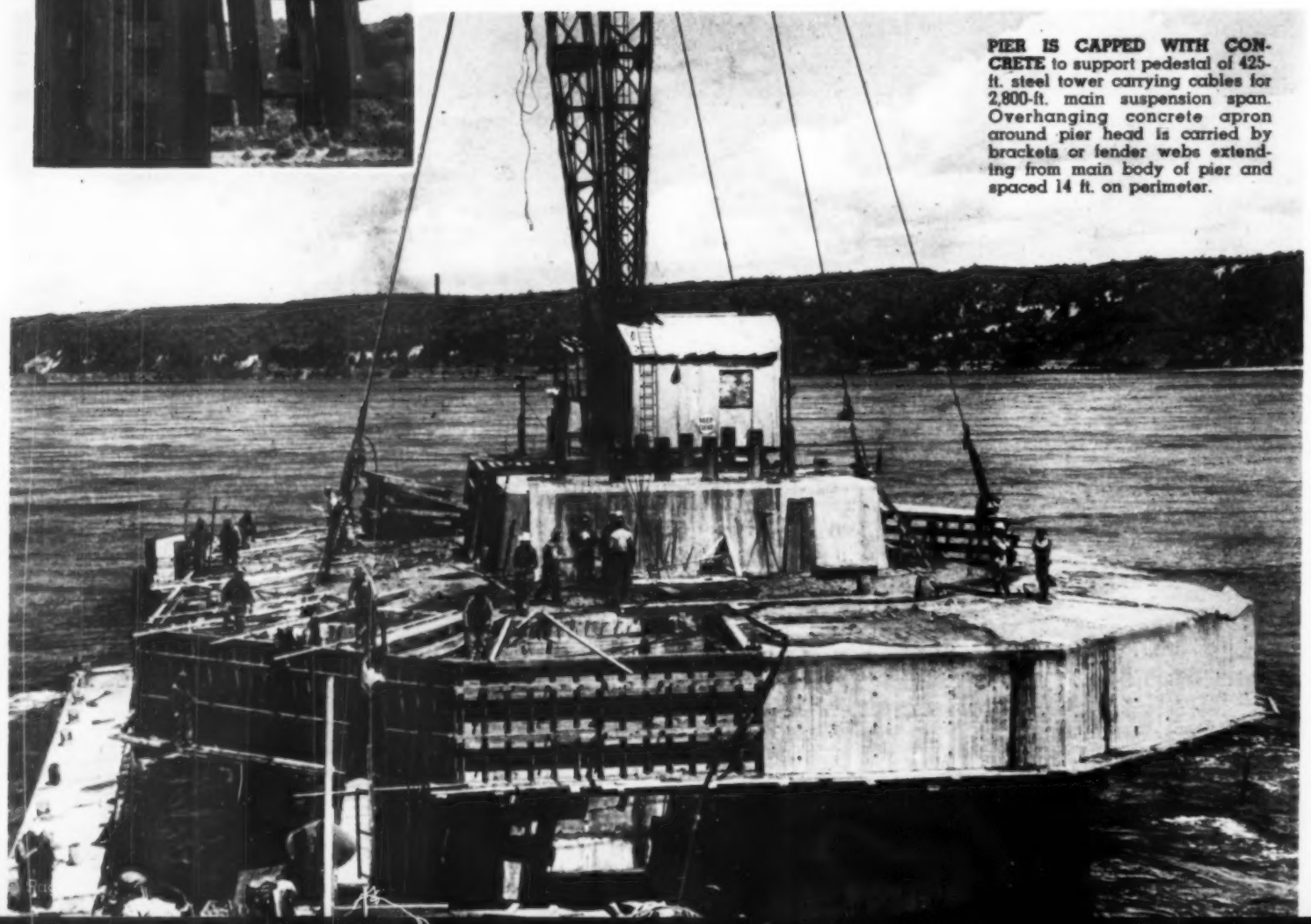


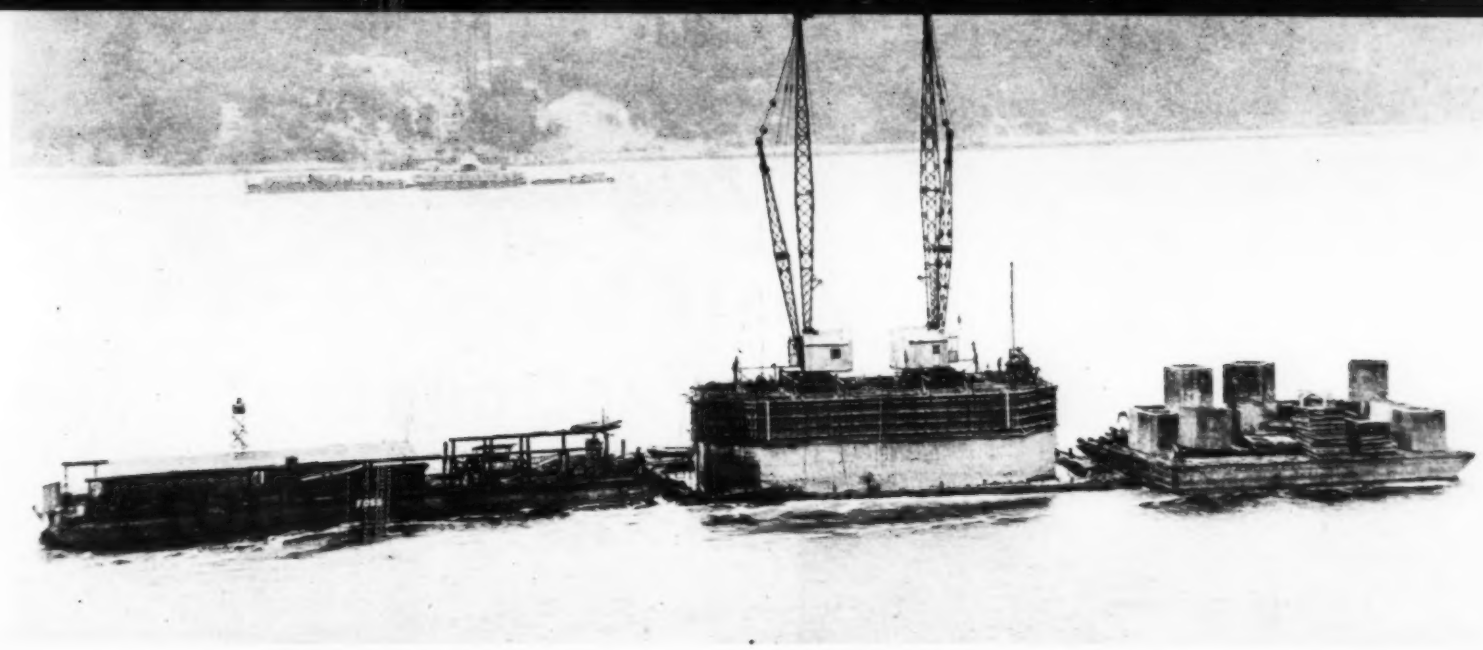
TREATED TIMBER FENDER, prefabricated and brought to site in sections **(inset),** marks final step in constructing pier. Fender is fastened to pier by galvanized bolts engaging inserts cast in apron.

Deep Caissons

SUNK FOR PIERS OF TACOMA NARROWS BRIDGE

PIER IS CAPPED WITH CONCRETE to support pedestal of 425-ft. steel tower carrying cables for 2,800-ft. main suspension span. Overhanging concrete apron around pier head is carried by brackets or fender webs extending from main body of pier and spaced 14 ft. on perimeter.



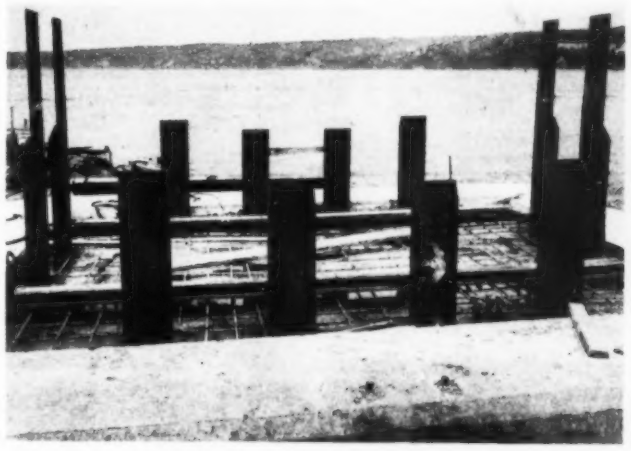


PAIR OF GUY DERRICKS handles erection of steel framework and placing of concrete in 12-ft. lifts at Pier 5. In background is Pier 4.

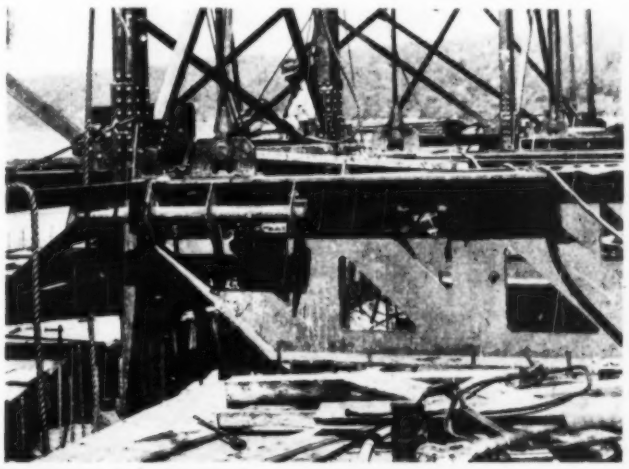
IN WATER FROM 120 TO 140 FT. DEEP and with tidal currents flowing at velocities of 8 to 10 mi. per hour, bottom-door caissons for the two main piers of the Tacoma Narrows bridge across an arm of Puget Sound, Washington, have been grounded, sunk into the channel bottom by dredging and concreted to support 425-ft. steel towers. These operations mark the completion of the first stage of a $5,950,000 project involving a 2,800-ft. cable suspension span and two 1,100-ft. side spans for a 5,000-ft. long bridge with 26-ft. roadway, under construction for the Washington Toll Bridge Authority by a group of contractors comprising the General Construction Co., of Seattle, Pacific Bridge Co., of San Francisco, and Columbia Construction Co., of Bonneville, Ore.

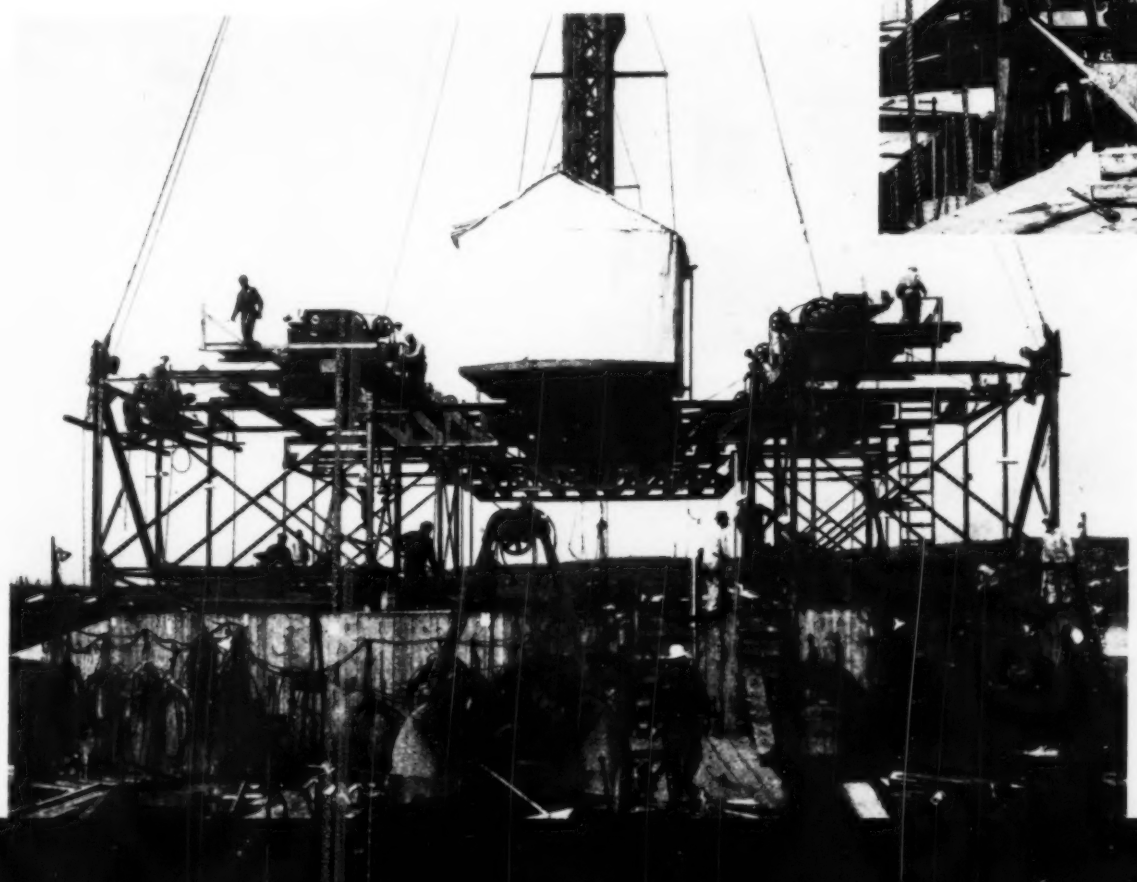
The rectangular caissons, equipped with steel cutting edges 66x119 ft. and timber false bottoms, consist of structural steel frameworks sheathed with timber. Built up and lagged to heights of 36 ft. on shore and towed to their respective sites, where they were anchored by a network of cables from huge concrete blocks sunk to the channel bottom, the caissons were extended progressively in lifts of 24 ft. as sinking progressed. Concrete walls were poured in 12-ft. lifts. After being grounded in 120 and 140-ft. depths of water, the caissons were carried to additional depths of 55 and 84 ft., after their false bottoms had been removed, by dredging with 2-yd. clamshell buckets through

(Continued on page 78)



GRILLAGE STEEL. in form of twelve 15-in., 40-lb. channels, is embedded 16 ft. in main body of pier to support tower base.





JUMPING DERRICKS ATOP CAISSONS (left) for erecting steel frame and timber sheathing was done in 12-ft. lifts with aid of eight electric winches on timber platforms fastened to structural steel framework. Four winches were required to raise each derrick which was supported by steel girders fastened by 3-in. tapered pins **(inset)** to gusset plates on frame. Winches were operated from central control station.

Long-Boom Crane

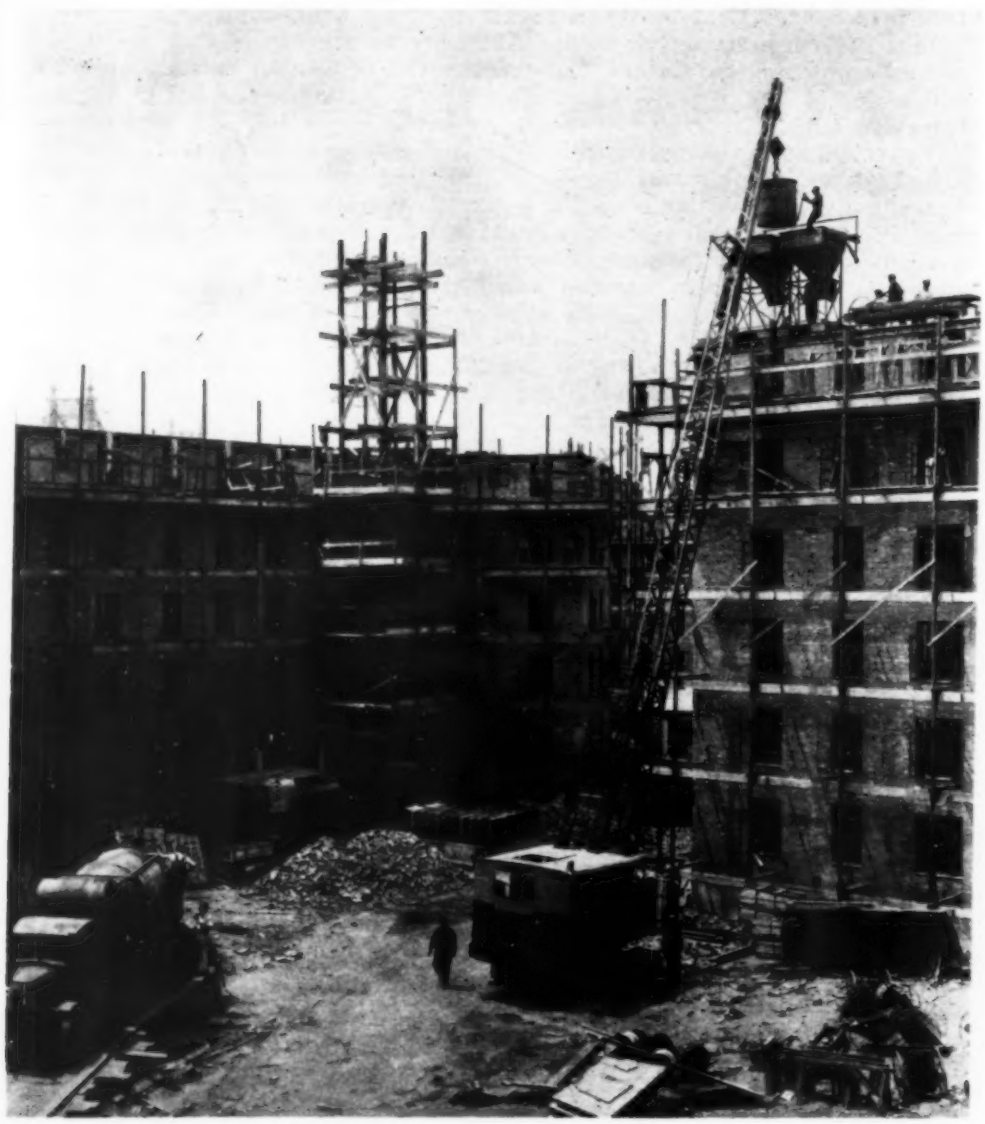
HOISTS 50,000 CU. YD. OF STRUCTURAL CONCRETE FOR *Six-Story Houses*

COMPLETING FINAL CORNER of roof pour after floor hoppers have been removed, concrete crew deposits concrete directly from bucket.

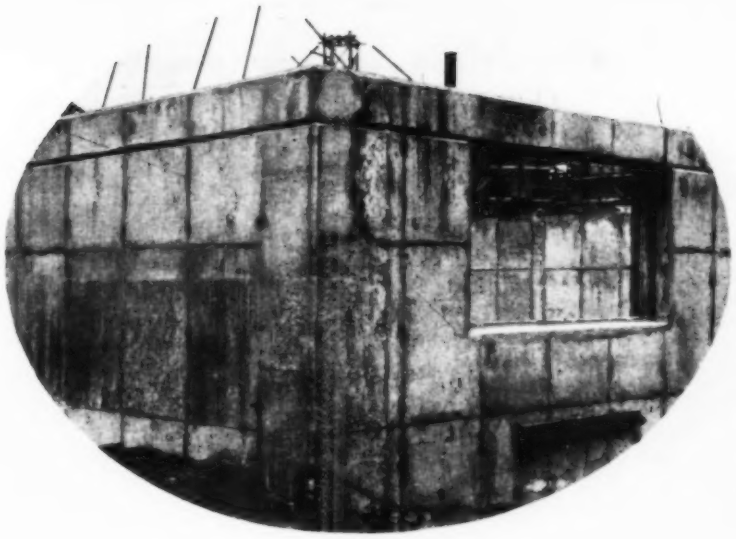
DISPENSING WITH ALL OTHER MEANS of hoisting concrete and reinforcing steel, the Corbetta Construction Co., New York City, concrete subcontractor under the Cauldwell-Wingate Co. on the superstructures of the $15,000,000 Queensbridge Houses project for the New York City Housing Authority, used one long-boom crawler crane and one truck crane to lift materials to floor and roof slabs of 26 six-story apartment houses. Truck mixers delivered mixed batches to hoppers from which the concrete was drawn off into 1⅓-yd. bottom-gate buckets for hoisting by the crawler cranes to floor hoppers.

All concrete except a small percentage in first floor slabs, which could be placed

EFFICIENT JOB MANAGEMENT for Corbetta Construction Co., concrete contractor, is first concern of Fred W. Narr, superintendent.



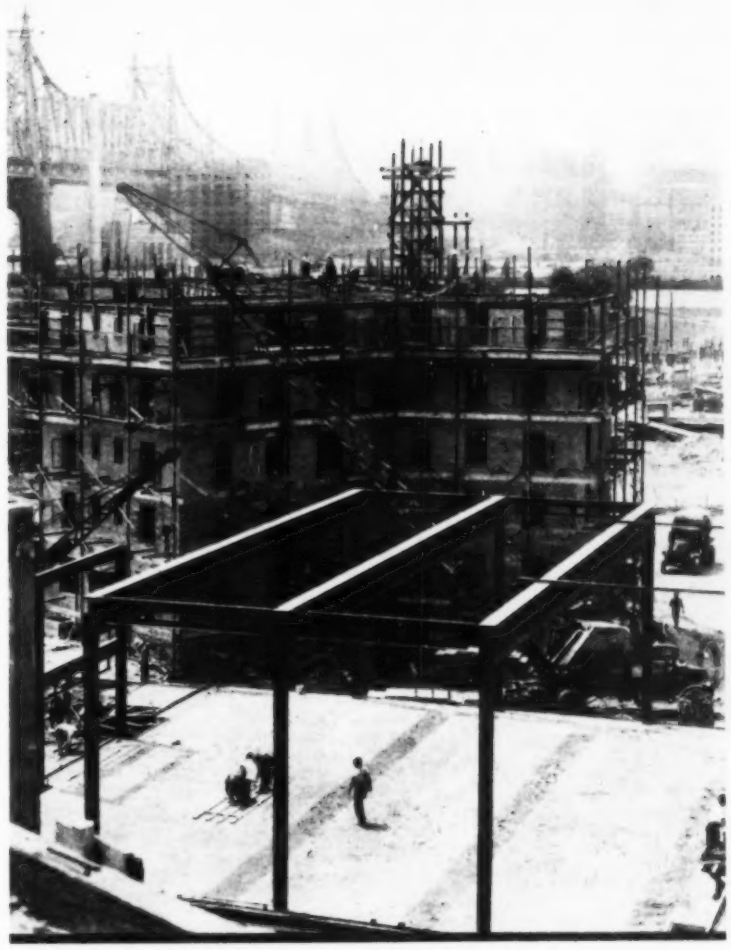
CRAWLER CRANE WITH 85-FT. BOOM hoists concrete to roof hoppers from ground hopper into which truck mixer discharges by backing up ramp. Contractor operates own fleet of six 4½-yd. Moto-Mixers, supplemented by additional truck mixers from commercial plant which supplies batched materials for concrete on job.



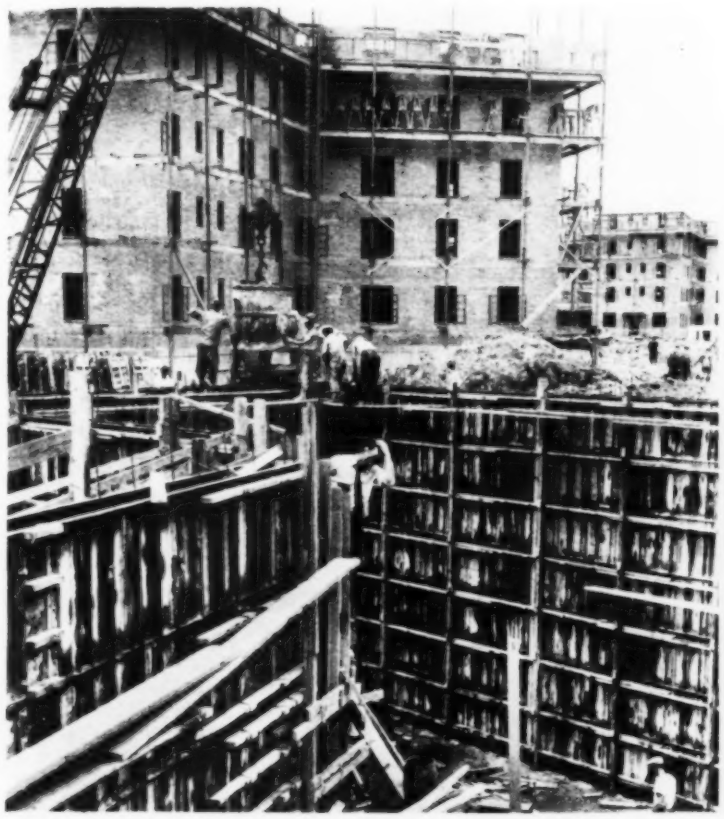
INDENTED DRIP CHANNEL in flush face of foundation wall provides economical substitute for drip cap, which is more expensive to form.

directly from buckets, was wheeled from the floor hoppers in 6-cu.ft. carts. Using these methods, the concrete contractor placed as much as 700 cu.yd. in 35,000 sq.ft. of slabs in one 7-hr. day, when operating two cranes with two slab crews, and maintained steady daily progress of 350 cu.yd. in 17,500 sq.ft. of slab with one crane, completing almost 50,000 cu.yd. of structural concrete in less than ten months. The procedure on this job affords an interesting contrast to the methods employed at Red Hook Houses, in Brooklyn, another project of the New York City Housing Authority, where the builder used bucket hoist towers to elevate concrete and Chicago booms on the towers to raise reinforcing steel, as described in CONSTRUCTION METHODS, May, 1939, pp. 42-45 et seq.

Job Layout—As indicated by an accompanying plan, the dwelling houses are made up of Y-units grouped two, three, four or five to a building. The 26 dwelling houses include 96



LONG-BOOM TRUCK CRANE beyond community building under construction in foreground handles 4,800 tons of reinforcing steel and incidental materials for concrete contractor.



PANEL FORMS. 2 x 3 ft. in area, consisting of plywood sheets in steel angle frames, are used to form foundation walls for monolithic pours up to 21 ft. high. Maximum height is required for boiler room walls.

RAISED TO FLOOR HOPPERS in 1½ yd. bucket, concrete is distributed by hand carts over panel runways. In background is Queensboro bridge, approach to which parallels east edge of project.

Y-units. In addition, the job involves community and children's buildings. Each Y-unit covers an area of 3,500 sq.ft.

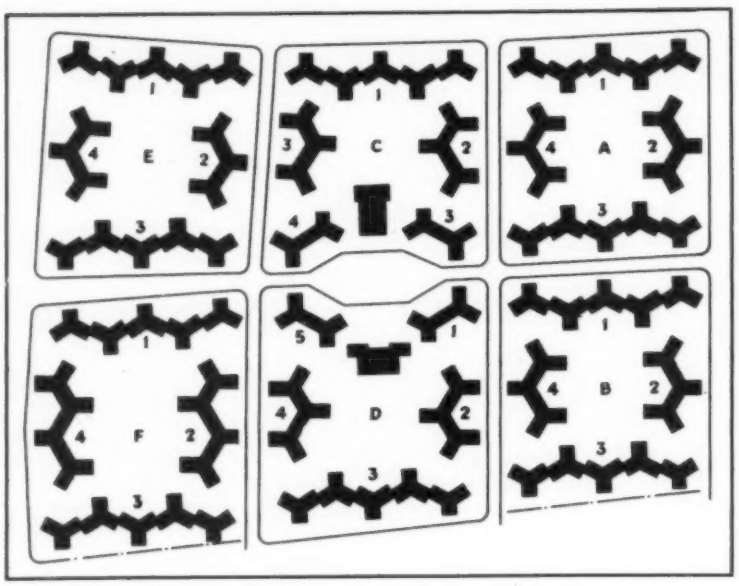
In starting the first group of buildings, in blocks A, C, and two buildings of D, the concrete contractor used slab forms for 36 Y-units, of 3,500 sq.ft. each, which provided a cycle of about ten days, including Saturday and Sunday holidays, between successive slab pours on each structure. The contractor's schedule called for an average of five Y-units each working day.

As the buildings are wall bearing, it was necessary to wait until masonry walls had been carried up to the next floor level before forms could be placed for the slab. With the forms in place, electricians had to lay out outlets before the steel setters could finish placing reinforcement.

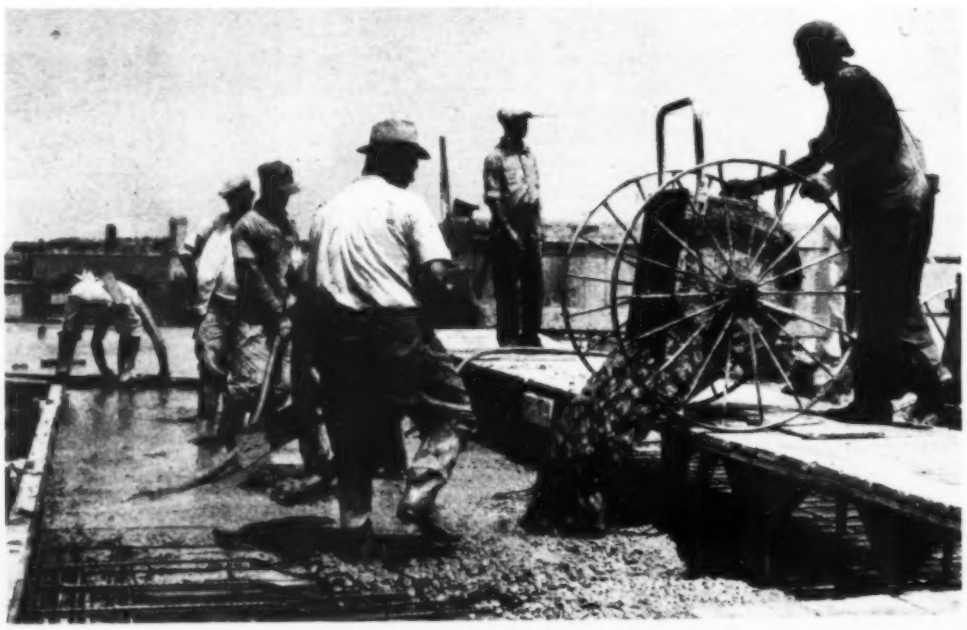
Delays resulting from the operations of other trades made a longer cycle advisable. On the second group of buildings, in E, F and D blocks, the contractor planned to increase the quantity of slab forms to 44 Y-units to provide a longer interval between successive floor pours on individual buildings, while still maintaining the five-Y-unit daily schedule. The form increase proved effective in expediting concrete work, as the predecessor trades acted to expand their crews to take advantage of the increased working area. As a result, the concrete contractor continued the use of 44 Y-units, and the job was completed on this basis.

Slab Forms—To build the forms for 44 Y-units, as contemplated for the second group, the contractor used 154,000 sq.ft. of special plywood. With a reserve stock on hand, the total quantity of plywood on the job was about 200,000 sq.ft. Haskelite gum plywood, 11/16 in. thick,

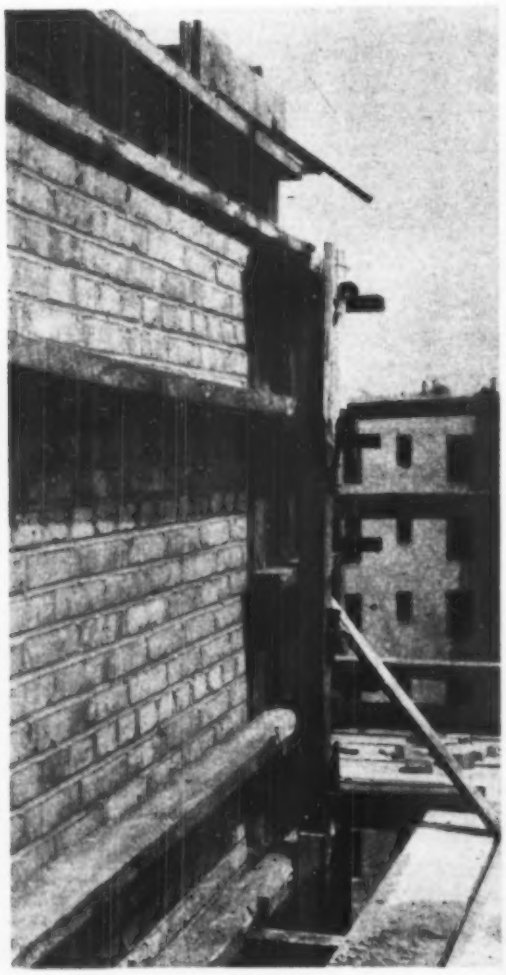
(Continued on page 70)



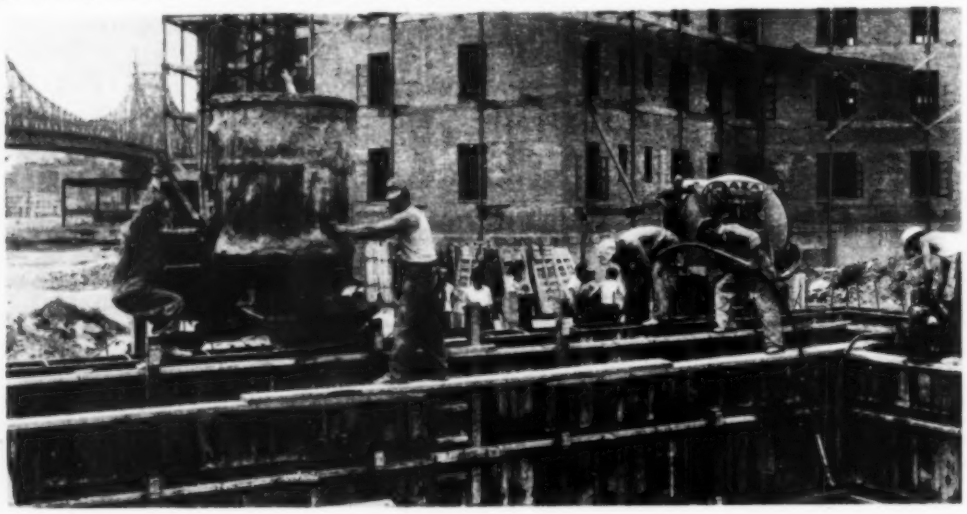
BY CLOSING INTERMEDIATE STREETS and combining twelve 200x600 ft. city blocks into six super-blocks, New York City Housing Authority obtains sufficient space for effective grouping of buildings around interior courts. Twenty-six apartment buildings contain 3,149 dwelling units of 12,967 rooms. These buildings, and two for community purposes, occupy 25.4 per cent of net land area and less than 20 per cent of gross land area of 44.4 acres. Public park and East River lie to west, at left.



CONTROLLED CONCRETE of economical mix is placed in forms and vibrated internally to produce 3,000-lb. minimum strength at 28 days. At left may be seen peripheral bars of belt beams placed around edges of slab to reduce expansion and contraction movements which cause wall cracks. On concrete slabs placed in cold weather, contractor uses vacuum mats to remove excess water, permitting finishers to work close behind concrete gang.



SPECIAL FORMS HOLD BELT BEAM, resting on masonry wall, and brick-faced corner column used in upper two stories to provide shearing resistance against distortion causing wall cracks.



ELEPHANT-TRUNK SPOUT and flexible-shaft internal vibrator assist placement of truck-mixed concrete in foundation walls up to 21 ft. high.

Jack-Knife Boom
OF 110-FT. REACH
Folds Up
FOR TRANSPORT

REACH OF 110 FT. BY BOOM of truck-crane is attained by 80-ft. main member supplemented by 30-ft. jib on erection of steel frame for high school building.

DESIGNED IN SECTIONS so that they can be folded up for job-to-job transport, 110-ft. "jack-knife" booms, with 30-ft. jibs, on two P&H truck cranes were the main items of equipment used by the Lee Crane Service Co. in erecting the structural steel framework for a new high school in Gloucester, Mass., involving a tower 130 ft. above ground level. Each boom is made up of an 18-ft. base, a 12-ft. head, two 20-ft. inserts, one 10-ft. insert and one 30-ft. jib.

The hoist cable for raising the boom is reeved with eight parts of line. This reeving, however, does not extend to the point of the boom, for from the boom point back to the boom hoist reeving sheaves, two support cables are used. This scheme is used so that it is unnecessary to detach the eight parts of the boom hoist reeving. Where the boom lengths are continually being changed, as on this and other jobs where truck cranes are used on a rental basis, this is claimed to be a decided advantage.

When the truck crane is moving any great distance, the 110-ft. boom is folded in three sections, as shown in the accompanying photograph. The top 32 ft. on the 80-ft. standard boom is folded underneath the bottom 48 ft. This is accomplished by means of a hinge arrangement at the 48-ft. point. In this case the boom hoist cables are dead-ended, as shown in the photograph, also at the 48-ft. point. The 30-ft. jib is carried on top of the 48-ft. section and is held there by special clamps.

To assemble the 110-foot boom on the job, the jib is first removed. Next, the special clamps which hold the 32-ft. section against the 48-ft. section are removed. This lowers the two rubber-tired wheels on the 80-ft. boom point to the ground. The operator then raises the boom with the boom hoist cable still attached to the 48-ft. point. This causes the boom to "jack-knife," and the 80-ft. point with the two

(Continued on page 76)

JOB-TO-JOB TRANSPORT is made easy by folding long boom into three sections. Top 32-ft. section on 80-ft. boom is folded underneath bottom 48-ft. section by means of hinge. The 30-ft. jib is held by clamps on top of 48-ft. section.

SMALL TOOLS ON CONSTRUCTION

1

2

3

4

5

1 ELECTRIC HAMMER (Stanley), equipped with special vibrating tool, transmits pulsations to outside wall forms, consolidating concrete and preventing formation of air pockets around steel reinforcement.

2 SCORING OF CEMENT WALK is done, after concrete has attained initial set, by portable electric saw (Skilsaw) equipped with abrasive wheel to produce decorative effect and facilitate drainage.

3 EASE OF TIGHTENING OR LOOSENING, preparatory to actual use of hand lever for complete setting of chain, is feature of this chain pipe vise (Billings & Spencer.) Design provides ample space for fingers between bench and elongated, knurled nut.

4 ASPHALTIC JOINT FILLER is readily applied to slots between slabs of concrete pavement with this pouring pot (Littleford) equipped with nozzle in conical bottom. Discharge is controlled by hand-operated plunger which also serves to guide flow into crack.

5 PILING IS STRAIGHTENED with aid of chains and pull hoist (Coffing) used on New Orleans waterfront. Operator applies tension by ratchet and pawl device in model rated at 1½ tons and weighing only 25 lb.

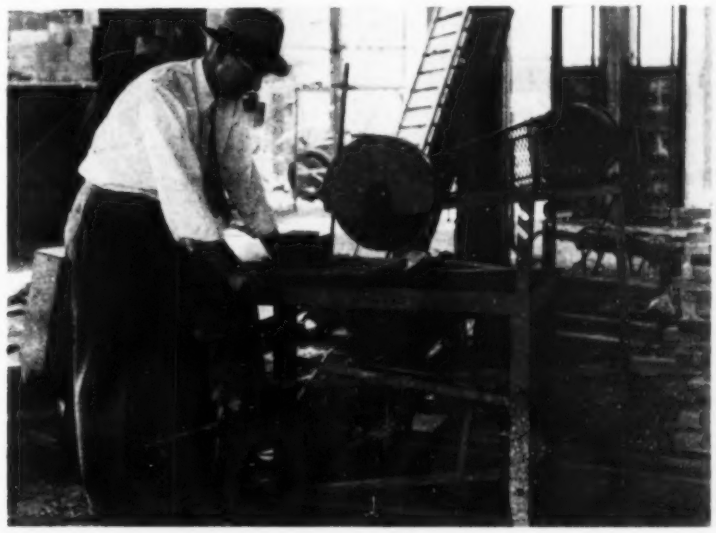
WHILE PIPE IS BEING THREADED after cutting by Beaver electrically powered pipe threading machine, operator for Evans Electric Co., Kansas City, Mo., subcontractor on electrical work, cleans end of conduit with brace and reamer

WOODEN LEG UNDER ELECTRIC MOTOR, 14.5 amp. 110 v., a.c. or d.c., eases task for helper lugging power unit of Viber portable flexible-shaft vibrator consolidating floor slab concrete

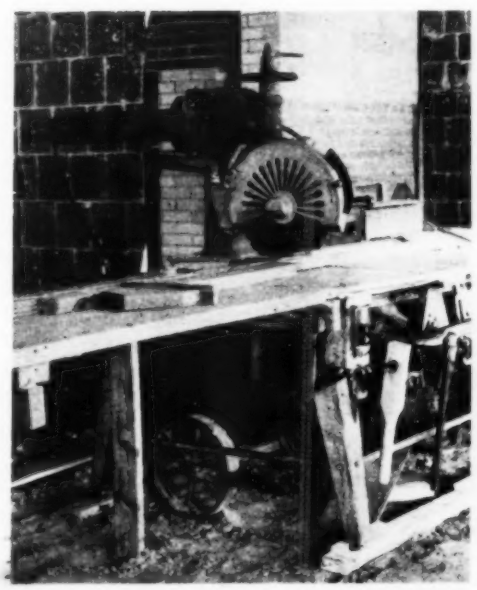
Small Tools

HELP BUILD $4,000,000 FOOD MARKET

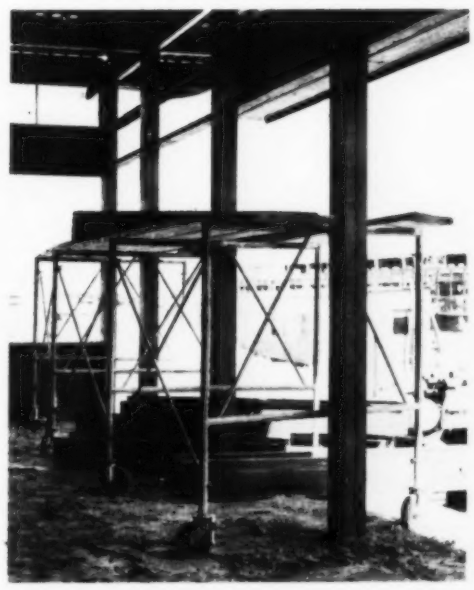
ACCOMPANYING PHOTOGRAPHS illustrate how small tools and light equipment served the S. Patti Construction Co., of Kansas City, Mo., in building four produce buildings of a new $4,000,000 food market and terminal for Kansas City, Kan.



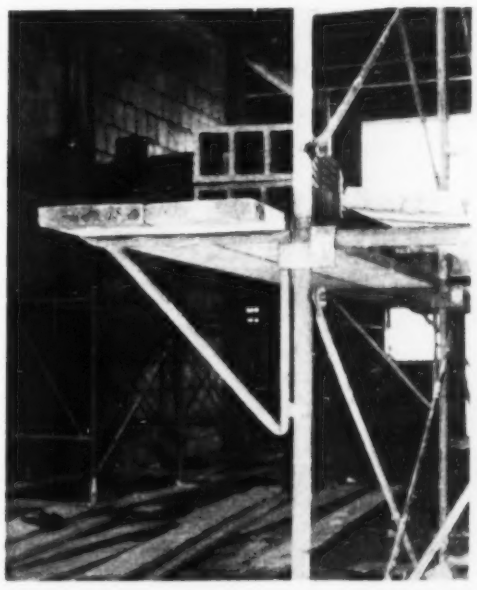
WITH ABRASIVE DISK mounted on rotating shaft under steel safety hood, E. H. FARRAR, assistant superintendent, S. Patti Construction Co., demonstrates operation of Clipper Mfg. Co. machine, driven by Century ¾-hp. 1,750-r.p.m. motor, for cutting tile and brick



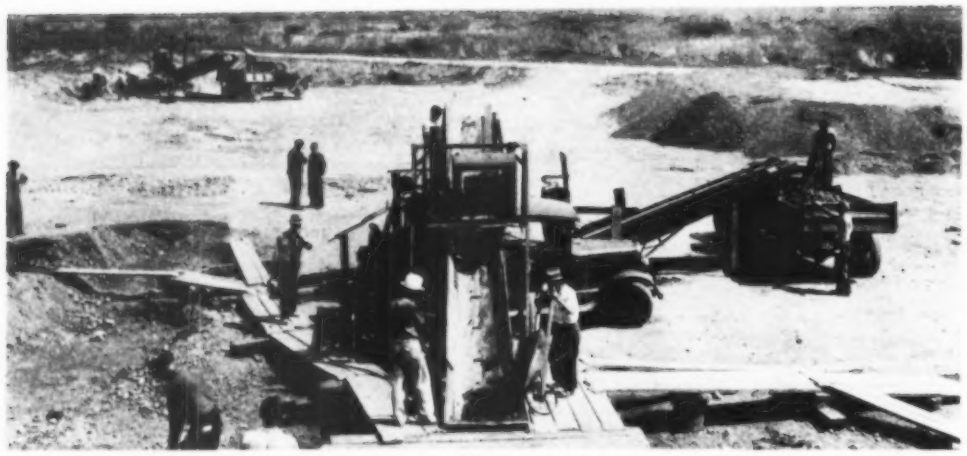
ANY ANGLE AND ANY MITER can be turned by Crescent 16-in. circular saw mounted on adjustable radial arm. Woods tape-insulated electric a.c. motor, 5 hp., 220-440 v., 3,600 r.p.m., is mounted in unit with saw



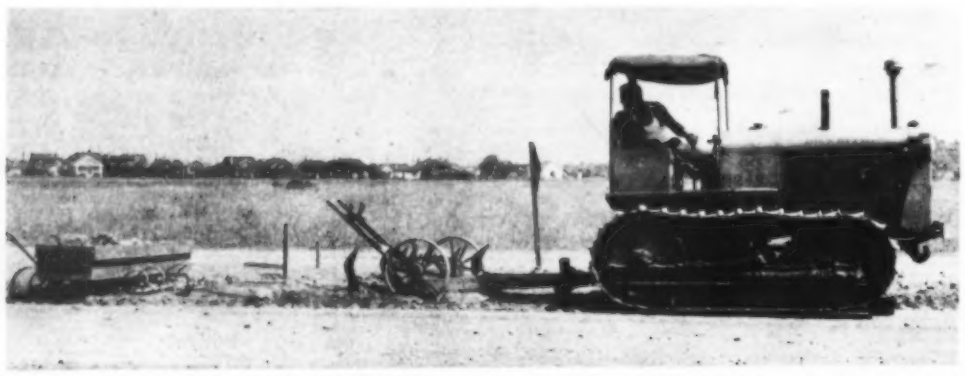
RUBBER-TIRED CASTERS placed under legs of Safway sectional tubular welded scaffold make units easy to move



HOOK-ON BRACKETS readily attached to and detached from Safway welded tubular scaffold provide support for tier platforms as height of scaffold is increased



BANK-RUN GRAVEL SOIL ON AIRPORT PROPERTY is fed by conveyor to bar screen which passes fine material into truck directly underneath. Oversize gravel falls into jaw crusher which reduces it for loading into truck at right, hauling backfill to underdrain trenches.



PREPARING SOIL FOR BASE CONSTRUCTION in airport runways, tractor draws light rooter and spring tooth harrow which loosen and pulverize compacted material.

SELF-PROPELLED PUGMILL MIXER fed by twin screws at front of machine takes asphalt emulsion from tank truck at left and adds metered quantity of bituminous material to processed soil.

ABOUT 48 HR. after soil and emulsion have been mixed, empty sheepsfoot roller compacts lower half of 4-in. base. Roller then is filled with water, and rolling continues until feet again "walk out" of lower half.

Bituminous Processed Base SUPPORTS AIRPORT RUNWAYS

By M. D. WILSON,
Assistant Engineer,
Department of Public Service,
Akron, Ohio

THE AKRON MUNICIPAL AIRPORT was recently improved by the construction of about 178,000 sq.yd. of hard-surfaced runways consisting of a bituminous wearing course laid over a base course of soil stabilized with asphalt emulsion. The base course is 4 in. and the surface course 1 in. in thickness. Underdrains were constructed along the sides of each runway and, after the surfacing was completed, a system of runway marker lights was installed.

A main runway is 150 ft. in width and more than 4,200 ft. in length. Three other runways are 100 ft. in width and vary from 2,400 to 3,600 ft. in length. The entire job was conducted as a WPA project. All equipment, other than trucks, and most of the materials were supplied by the City of Akron, together with the technical supervision and equipment operators. The WPA contributed trucks, common labor, labor supervision, and a small amount of material.

Various operations necessary to stabilize the base course were as follows: removing sod, testing natural soil, adding bank run sand and gravel to obtain correct soil gradation, scarifying soil, shaping to grade and crown, mixing soil with asphalt emulsion, rolling soil-emulsion mixture, leveling and shaping surface of base course, final rolling, and applying prime coat.

Stripping Topsoil

Motor-graders were used to skin off the sod and blade it into windrows from which it was hand-loaded into trucks for removal to another part of the field. Coke forks, used in place of shovels, enabled the men to separate the soil from the vegetation.

A field laboratory was set up in the Terminal Building and numerous tests

were made to determine the amount of bank run sand and gravel to be added to the natural soil in order to obtain a mixture that would contain 26 per cent of material fine enough to pass through a 200-mesh sieve.

Gravel Pit

On the northwest corner of the airport property, a gravel pit was opened to supply the bank run material. In order to provide employment for the maximum number of men, the bank run material was excavated by hand labor and moved in wheelbarrows to a belt conveyor. The conveyor discharged on to a 2-in. bar screen; material passing through the screen dropped into trucks and was hauled to the runways, the oversized stones dropped into a jaw crusher which reduced them to crushed gravel for backfilling the underdrain trenches.

After the correct amount of bank run material had been added and the runways brought to the proper grade and cross-section, it was found that the trucking and other wheeled traffic had done a very thorough job of compacting the soil. In some cases the runways were harder than when work started. Therefore, it was necessary to scarify and pulverize the soil for the full depth to be mixed. Several devices were tried for this purpose, but a tractor pulling a light rooter and spring-tooth harrow, hitched in tandem, performed most satisfactorily.

Preparatory to mixing, a 3-in. water line was laid along one side of each runway. Tees and valves, installed every 300 ft. provided connections for the mixer hose. Asphalt emulsion was shipped in tank cars to a nearby railroad siding where an electric driven pump transferred the emulsion from the cars into two 600-gal. tank trucks.

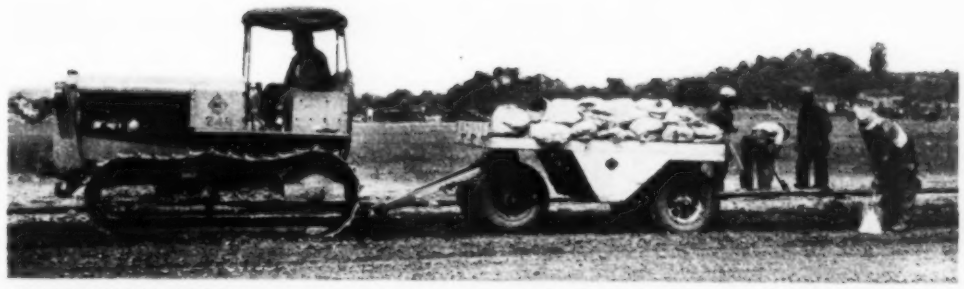
Pugmill Mixer

The mixer was a self-propelled unit equipped with an asphalt pump, storage tanks, and a pugmill fed by means of twin screws and blades on the front of the machine. A spreading device, attached to the rear of the machine, roughly spread and leveled the mixture. The tank trucks traveled alongside the mixer and kept it supplied with emulsion through a connecting hose. On this job the mixer handled the soil without its being windrowed ahead of the machine as is the usual practice in this type of work. Thus we were able to save considerable time, money and labor which would ordinarily have been spent on windrowing.

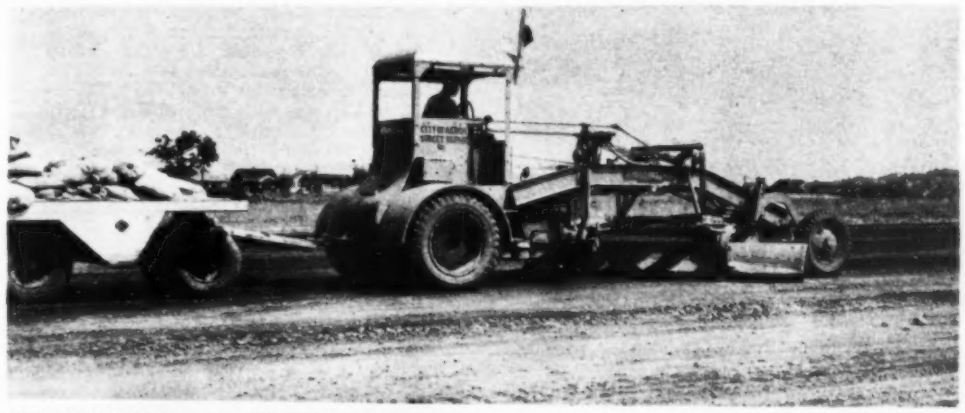
All of the base stabilized in 1937 was mixed by the method just described. In the fall of 1936, however, more than 60,000 sq.yd. of stabilized base material was mixed with three 27E paving mixers.

About 48 hr. after the soil and emulsion had been mixed, rolling was started with an empty sheepsfoot roller pulled

(Continued on page 86)

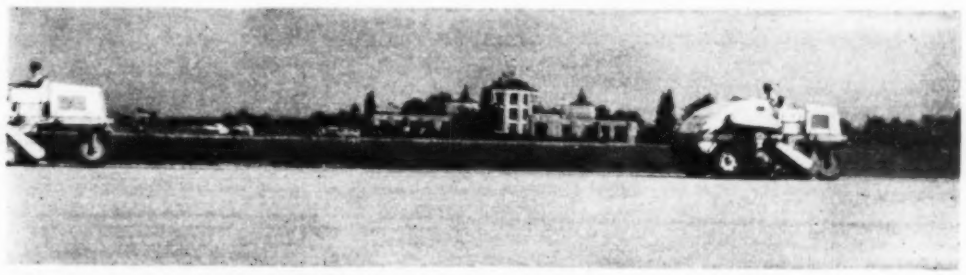


UPPER HALF OF BASE is compacted by pneumatic-tired roller, which supplies kneading action to processed soil mixture.



TO BRING SURFACE TO CROWN AND GRADE, motor grader strikes off high spots and pulls rubber-tired roller which compacts material moved into depressions. Planer works in conjunction with this equipment on leveling operation.

STREET FLUSHER SPRINKLES BASE and keeps top plastic for working when weather conditions cause too rapid drying.



COMPLETED SECTION OF MAIN RUNWAY is swept by pair of motor sweepers. Seal coat of light-colored limestone chips and quick-breaking emulsion improves visibility of runways.

UNDERDRAINS ARE INSTALLED along edges of each runway, with backfill of crushed gravel around drain pipe.

Present and Accounted For —

A Page of PERSONALITIES

KINGSLEY DAM, 26,000,000-cu.yd. hydraulic fill embankment on North Platte River, near Ogallala, Neb., (described elsewhere in this issue) is constructed under direction of **(left)** GEORGE P. LEONARD (at left), general superintendent for Minneapolis Dredging Co.—Martin Wunderlich Co., contractors, and GEORGE N. CARTER, resident engineer for Central Nebraska Public Power & Irrigation District. Many photographs reproduced with Kingsley dam article elsewhere in this issue were taken with assistance of **(right)** E. J. MECKE (at left), assistant resident engineer, C.N.P.P. & I.D., and O. P. KITCHEN, dredgemaster of upstream dredge Keystone.

Associated General Contractors Hold Board Meeting in New York, Oct. 2-5

(Above) H. B. ZACHRY (left), president, H. B. Zachry Co., Laredo, Tex.; and M. W. WATSON, contractor, Topeka, Kan. Mr. Zachry is nominee for president and Mr. Watson nominee for vice-president of A.G.C. for 1940.

(Below) EDWARD J. HARDING (at left), managing director of A.G.C., Washington, D. C.; ARTHUR C. TOZZER, **(center)** vice-president, Turner Construction Co., New York City; and GUY F. ATKINSON, president of A.G.C., San Francisco, Calif.

(Above) FREDERICK L. CRANFORD (left), president, F. L. Cranford, Inc., Brooklyn, N. Y.; and JAMES GIBBONS, consulting engineer, American Surety Co., New York City.

(Left) S. M. SIESEL, of Siesel Construction Co., Milwaukee, Wis.; and MRS. McCARTHY, secretary to E. J. Harding, of A.G.C. staff.

(Right) COL. R. S. PROCTOR (left), Association of Casualty and Surety Executives, New York City; and RICHARD HOPKINS, president, Richard Hopkins Co., Albany, N. Y.

CONSTRUCTION EQUIPMENT NEWS

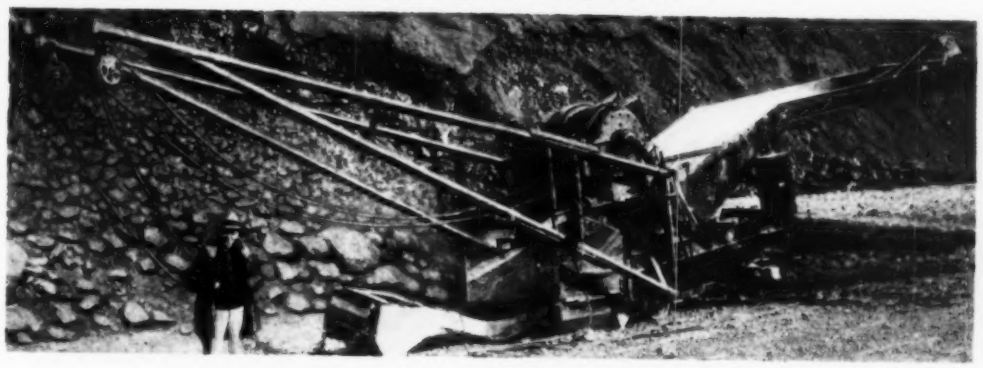
(ALL RIGHTS RESERVED)

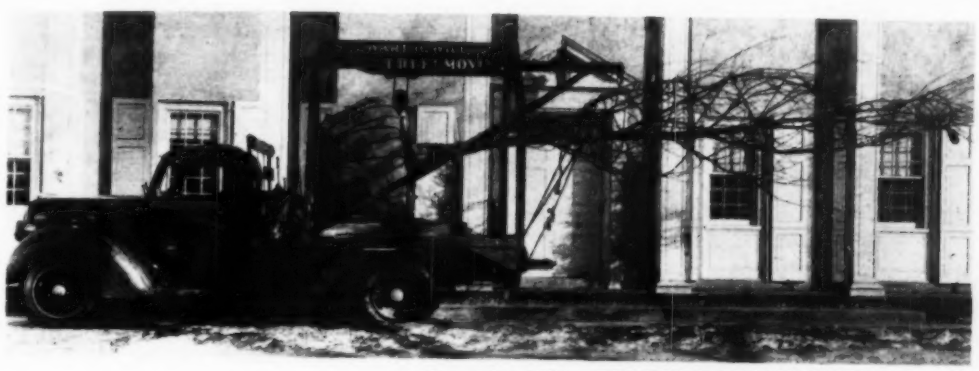
Review of Construction Machinery and Materials for DECEMBER 1939

SHOULDER FINISHER said to be economical machine for finishing shoulder and backslope to accurate lines. Manufacturer's claim: Two men, operating unit, pulled by either light tractor or heavy truck, can finish shoulder up to 11 ft. wide with backslope up to 8 ft., completing one mile a day on both sides of road with reasonable preparatory grading. Expensive and inaccurate hand labor and road grader finishing said to be eliminated. Finisher adjustable to meet shoulder specifications of various state highway departments. Main blades vary from 6 to 12 ft. 6 in. and are adjustable up and down on both inner and outer end. Offset hitch enables hauling truck or tractor to operate off pavement.—**Insley Mfg. Co., Indianapolis, Ind.**

TRUCK CRANE consisting of Lima Paymaster with motor truck mounting is powered by 6-cylinder gasoline engine, 4⅜x4¾-in. bore and stroke, with silent chain drive to crankshaft. Anti-friction bearings at all vital bearing points, including drums, make possible smoother operating machine. Weight kept to minimum by use of high tensile steel in construction and by placing machinery to extreme rear of revolving frame. For comfort of operator, levers are located within cab, and an extra wide bus seat is provided, as well as winter front for cab in stormy weather. Boom hoist separate unit mounted on rotating base casting is independent in operation. Crane boom 35 ft. long made in two sections of alloy steel cord angles pin-connected, eliminating use of bolts and saving time and effort in preparing for job.—**Lima Locomotive Works, Inc., Shovel and Crane Division, Lima, Ohio.**

DOUBLE-BOOM ROCK LOADER (below) said to eliminate need for anchoring tail sheaves at face or heading of tunnel as shown in operation on 24-ft.-diameter diversion tunnel of Green Mountain Dam, Colorado. Claimed to provide efficient, low-cost and extremely flexible method of digging, conveying and loading. In Green Mountain conversion tunnel 8-ft. round of 200 yd. is mucked and loaded in 3 hr. Scraper reaches over muck pile removing rock close to heading and enabling drillers to drill next round without delay. Loader operates on permanent track 25 to 50 ft. distant from heading. Powered by 50-hp. electric driven, three-drum scraper hauler. Two tail rope drums with ropes running through sheaves on booms permit scraper to be placed in any desired position for digging. When operating, 18-ft. spreader holds booms apart.—**Sullivan Machinery Co., Michigan City, Ind.**





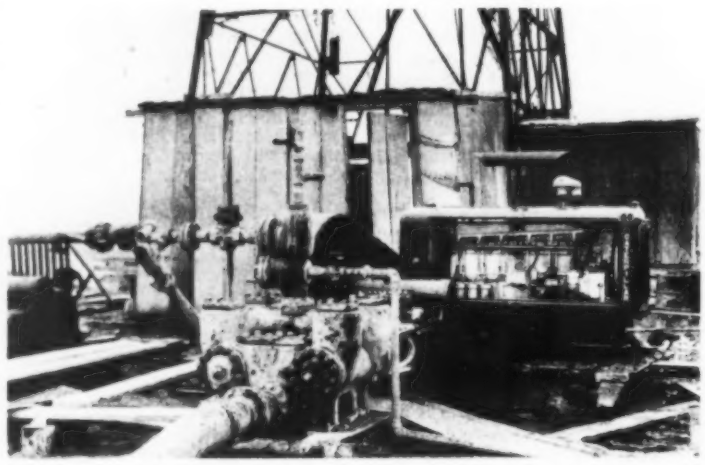
TREE-MOVING UNIT (right) for moving and transplanting trees may be erected on truck platform body and then removed to permit use of truck for other purposes.—**Gar Wood Industries, Inc., Winch Division, Detroit, Mich.**

END-DISCHARGE, NON-TILT MIXER. 3½S, features driving of drum by rubber drum rollers, eliminating ring gear, pinion and countershaft, and said to reduce wear and to provide smoother running. Large gated batch hopper permits preparation of batch while another batch is being mixed. Gate swings into drum with each batch. Tilted flow-line discharge chute increases speed of discharge. Other features:

(1) Box-type welded steel plate axle is reinforced at ends for support of wheel spindles which are equipped with two anti-friction roller bearings for pneumatic tires; (2) Wisconsin 1-cylinder, vertical-type air-cooled motor with 2½x2¾-in. bore and stroke and displacement of 13.5 cu.in. at 1,975 r.p.m. loaded; (3) self-cleaning, automatic syphon type water measuring tank discharging any amount between 1¼ and 6 gal. to fraction of pint; (4) low center of gravity, correct balance and anti-friction wheel bearings assure easy handling by one man on job.—**Kwik-Mix Concrete Mixer Co., Port Washington, Wis.**

★ ★ ★

NATURAL GAS CONVERSION ATTACHMENT for use with 125-hp. diesel engines consists of special head designed to lower compression and provide spark plugs and to take place of diesel cylinder head, injection valves and lines. Diesel fuel injection pumps also are replaced by magneto, and a carburetor is added to intake air line. Entire process consumes about 4 hr. and may be done in the field. Characteristics of engine converted to gas are same as with diesel operation. Conversion parts delivered in specially constructed box built to accommodate all replaced parts and to provide clean storage space for units not in use.—**Caterpillar Tractor Co., Peoria, Ill.**



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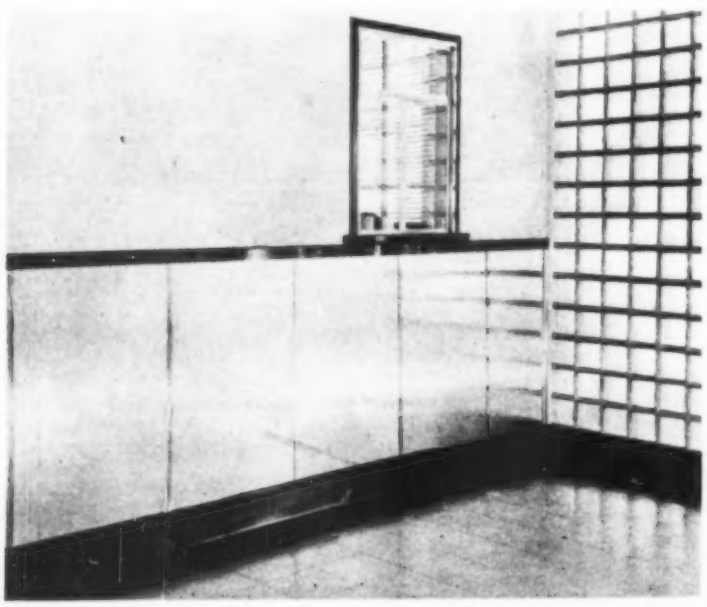
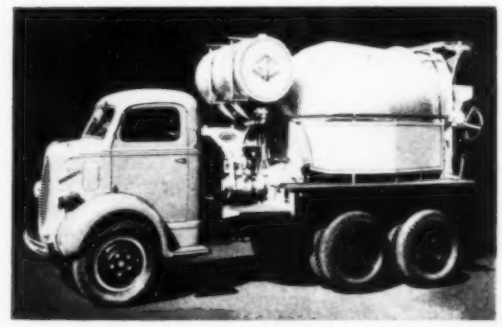
STAINLESS STEEL "LUMBER" PANELS with trade name of "Ludlite Bord" are available to industrial consumers, architects, builders and contractors for use in home building and other construction fields. Ludlite Bord consists of thin sheets of stainless steel permanently bonded to inert backing material to form strong rigid panels. Outer surface retains beauty and utility of stainless steel making it possible to obtain same effects as with regular stainless steel sheets and at the same time to lower cost and eliminate use of more than ordinarily skilled workmen for installation. Ludlite Bord claimed to have following advantages: (1) Fireproof and fully weather resistant; (2) has excellent acoustic properties; (3) resistant to denting or marring by impact; (4) ease of fabrication — may be sawed to shape with ordinary handsaw; sheared as easily as plain sheet metal and drilled as readily as ordinary hard wood; may be nailed or screwed in place; joints may be soldered, and if work is done with care, it may be welded. Made in two standard size panels, 2x4 ft. for wainscoting and 2x8 ft. for wall surfacing. In two thicknesses, ⅛ and ¼ in. weighing 1.54 and 2.5 per square foot respectively. Available in two finishes: Satin and pebbled (embossed face). —**Allegheny Ludlum Steel Corp., Pittsburgh, Pa.**



THREE NEW TRUCKMIXERS in 3-, 4- and 5-cu.yd. sizes have been added to "Smith-Mobile" line of concreting equipment. Improvements: (1) Instead of conventional loading hatch, Smith-Mobile is equipped with large feed chute located at high end of drum so that shrinking and mixing start as soon as materials enter drum; high-pressure, turbine-type water pump supplies water through drum charging opening; (2) unusually high discharge permits larger



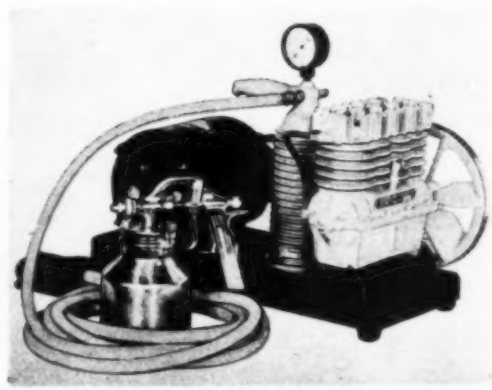
radius of spout distribution, eliminating need for ramps when concrete is discharged into hoppers or high forms; discharge door may be opened wide to permit inspection of batch while drum is revolving; (3) for discharging, operator merely reverses direction of drum; speed of discharge not controlled by opening or closing of discharge door but by clutch lever; dual control levers banked for operation either from platform or ground. Other features: Welded Man-ten steel mixer drum and frame; machine cut, heat-treated alloy steel gears; heat-treated, ground steel shafts on roller bearings; welded, annealed steel transmission case and drum support pedestal; oil-type disk clutches; two-compartment overflow type water tank; two-piece swivel distributing chute; choice of separate gas engine drive or power take-off for truck engine drive.—**T. L. Smith & Co., Milwaukee, Wis.**

★ ★ ★

TO PREPARE GALVANIZED METAL FOR PAINTING, for cleaning it of dirt, oil and fingerprints and for building up surface film to provide bond for paint, concentrate called "Galv-A-Niel" is said to be satisfactory for application by dipping, brushing or spraying. Solution is made of one part concentrate and three parts water. One gallon will cover 1,200 to 2,000 sq.ft., depending upon manner of application. Claimed to provide positive assurance against peeling and blistering of paint and to prevent spread of corrosion.—**Mar-Nel Chemicals, Redford Sta., Detroit, Mich.**

★ ★ ★

4-CYLINDER PORTABLE AIR COMPRESSOR, named Pressure King, said to embody engineering principles used in building modern 4-cylinder automobile, uses four steel pistons with step cut rings. Bore, 1⅜-in.; stroke, 1⅝-in. Powered with ⅓-hp. motor. Delivers 4 cu.ft. of air per minute at 60-lb. pressure. Pressure adjustable from 0 to 80 lb. Cooled by fan



blade type of flywheel and extra deep fins on block and head. Air cleaning chambers filter air and remove water and oil. Stainless steel valves easily removable, and intakes are protected with special filters making numerous cleanings unnecessary. Photo shows special combination outfit consisting of Pressure King compressor, ⅓-hp., 110-v., a.c., 60-cycle motor and pressure spray gun, bleeder type, with two tips for fine and coarse materials and two nozzles for fan spray. Compressor also may be driven with ½-hp. Briggs & Stratton gasoline engine when electric power is not available.—**Empire Compressor Mfg. Co., Inc., Benson St. & Penna. R.R., Reading, (Cincinnati) Ohio.**

Photographs Courtesy of W. P. A.

Partial List of Structures for which Tapered Monotubes Were Specified in 1939

Hangars and Administration Building, North Beach Airport, New York City.
Municipal Auditorium, Zanesville, Ohio.
Sewage Disposal Plant, New Haven, Conn.
U. S. Navy Aeronautical Laboratory, Philadelphia, Pa.
Incinerator, City of Pittsburgh, Pa.
State College Building, Lansing, Mich.
Paper Mill (Hollingsworth & Whitney), Mobile, Ala.
Charity Hospital, Monroe, La.
Retail and Wholesale Market Bldgs., Kansas City, Mo.
National Orange Show Stadium, San Bernardino, Calif.
Calvin Coolidge High School, Washington, D. C.
Steam Plant (Northern States Power Co.), La Crosse, Wis.
Federal Housing Project, Brooklyn, N.Y.

UNION METAL

Speed Up FOUNDATION WORK WITH *Safety*

● Nothing goes up until the piling goes down. That's why Tapered Monotubes are used on jobs where a saving of hours and days mean much to owner, engineer and contractor.

Monotubes are time-savers because their light weight makes for easy handling; can be driven speedily without core or mandrel; are installed by any competent piling contractor using an ordinary crawler crane equipped with leads and standard steam hammer.

But with all these time-saving advantages, you are assured of a quality substructure that meets engineering requirements. Monotubes are readily inspected from top to toe after driving—give you steel-encased concrete piles possessing high load-supporting values.

There's a Monotube of a gauge, taper and length for every piling need. Competent engineers are available to help you. Write for Catalog No. 68A.

THE UNION METAL MANUFACTURING CO.
CANTON, OHIO

LOOK

What You Save With ARMCO PILING

ARMCO Sheet Piling is supplied in several designs to meet different job requirements. All types are easy to handle and assure proper alignment.

You can cut job costs with ARMCO Sheet Steel Piling because these sturdy plates can be used again and again. Why buy new piling for every job?

Material costs are lower too. The special corrugated design of ARMCO Sheet Piling assures ample strength without excessive weight. You buy the exact gage that meets your requirements.

Learn more about the money-saving advantages of ARMCO Sheet Steel Piling. Write today for prices and complete information. The Armco Drainage Products Assn., 372 Curtis St., Middletown, Ohio.

ARMCO

SHEET STEEL PILING

SOLID RUBBER WHEELBARROW TIRE is available for use in operations where tires are exposed to excessive abuse. Installations of 16x3-in. Vulc-on tires cured directly to wheelbarrow wheels have been made in steel mills, foundries, automobile

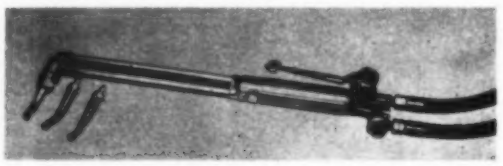
plants and other industries where tires are overloaded and receive undue wear. Also available is "Nu-Seal" wheelbarrow wheel for pneumatics with bearings sealed against dust and dirt and designed for heavy-duty service in brick plants and like industries.—**B. F. Goodrich Co., Akron, Ohio.**

★ ★ ★

FOUR NEW HELMETS and four new hand shields made of vulcanized fiber either in fabricated or one-piece construction are now available for welders who are looking for equipment that is comfortable, safe, convenient and durable. Helmets have free-floating headgear and an outside friction joint as standard equipment. Three types of glass holders are available: Deep-drawn leakproof steel, improved Bakelite and new Dowmetal lift front. These holders have special feature: They hold welding and cover glass in position flexibly, not rigidly, in order to cushion shock if struck accidentally.—**American Optical Co., Southbridge, Mass.**

★ ★ ★

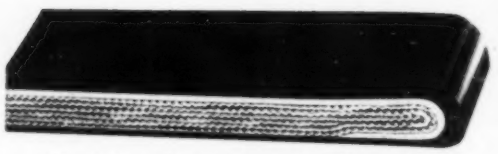
OXYACETYLENE GOUGING NOZZLES, available in three sizes, for use with standard hand-cutting blowpipe, said to provide means for quick and accurate removal of narrow strip of surface metal from steel plate, forgings and castings. Designed to deliver relatively large jet of oxygen at low velocity with



which, by proper manipulation of blowpipe in which nozzle has been inserted, smooth, accurately defined groove may be cut or gouged out of surface of metal. Uses: Gouging underside of electric welds; removal of weld metal such as temporary tack-welds and defective welds; preparation of plate edges for welding; maintenance and scrapping operations.—**The Linde Air Products Co., 30 East 42nd St., New York City.**

★ ★ ★

IMPROVED CONVEYOR BELT designed to withstand unusually severe service conditions consists of special weave breaker-strip fabric embedded in heavy layer of soft white gum. This layer is inserted next to belt carcass as integral part of belt cover, providing shock absorbing cushion for cover, increasing effectiveness in resisting gouging, snagging and like severe wear encountered in heavy service. Extra protection for belt carcass also is provided, because of ability of breaker-insert to withstand and cushion heavy blows. — **Mechanical Goods Div., United States Rubber Co., 1790 Broadway, New York City.**



★ ★ ★

NEW-TYPE LEVER ARM CLAMSHELL BUCKET, 1¾-cu.yd. capacity, said to reduce maintenance problems resulting from "dropping the bucket" in order to insure satisfactory initial penetration when excavating. As shown by accompanying illustrations, all four corner bars are mounted directly on head pin which communicates stresses to corner pins without

passage through riveted or bolted construction. Photos also show progressive steps in assembly of new bucket head. Cast-steel head block, when secured in position between two plates, joins one pair of corner bars together in rigid A-frame assembly. This improved construction said not only to provide for direct transmittal of stress and shock be-

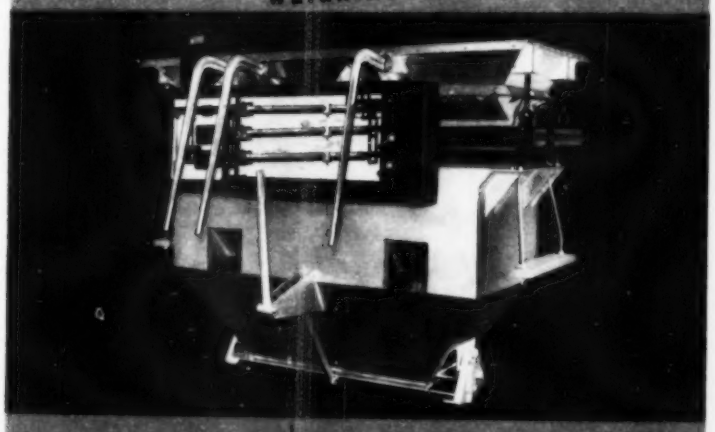
tween head and corner pins, but also to insure rigidity which maintains permanent true alignment between upper and lower sheaves, thus assuring long cable life and preventing mechanism of bucket from becoming loose and wobbly from impact and shock stresses. Weight, 4,550 lb.—**Blaw-Knox Co., Pittsburgh, Pa.**

★ ★ ★

NEW ARC-WELDING ELECTRODE is said to facilitate finishing operations on welded products by eliminating need of dressing or smoothing welded seams. Known as "Fleetweld -10," electrode is of particular use for finishing bead welding on "U" groove welding in downhand position. Provides full slag coverage, and weld deposit is claimed to be exceptionally smooth, metal spreading out evenly and line of fusion with base metal becoming practically unnoticeable. Finish beads made in V-butt

(Continued on page 68)

"I can't afford to take a chance—so I always use reliable BLAW-KNOX WEIGHING BATCHERS."



To quickly and accurately measure AGGREGATES, CEMENT AND WATER, Blaw-Knox Weighing Batchers are standard equipment in widespread use by road contractors, for general construction, material yards, and ready mixed concrete plants. They satisfy all modern specifications. Furnished for manual or automatic operation.

The reliability of Blaw-Knox Weighing Batchers is acknowledged by thousands of users. Send for Catalog No. 1566.

BLAW-KNOX DIVISION of Blaw-Knox Company
FARMER'S BANK BUILDING PITTSBURGH, PA.

9

BLAW-KNOX *Aggregates and Cement*
WEIGHING BATCHERS

SEVEN MATERIALS IN ONE BIN?

"You Bet—this new BLAW-KNOX plant accurately measures and loads aggregates, cement, and water into truck mixers."

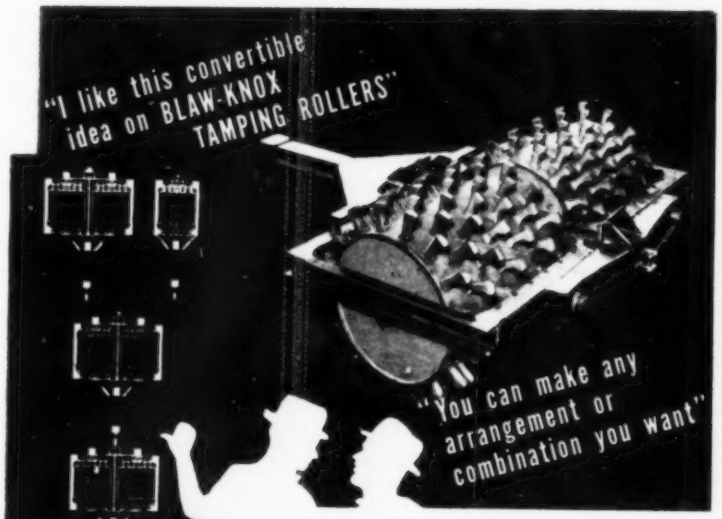
Blaw-Knox Truck Mixer Loading Plants include overhead storage bins for aggregates and cement; accurate Weighing Batchers for aggregates, cement and water, arranged for manual or automatic operation; complete conveyors for handling materials from cars or trucks to bins, when desired—all properly designed and built to your requirements as an efficient unit for truck mixer loading. See Blaw-Knox Catalog No. 1582.

18

BLAW-KNOX

BLAW-KNOX DIVISION
OF BLAW-KNOX CO.
Farmers Bank Bldg. Pittsburgh, Pa.

TRUCK MIXER
LOADING PLANTS



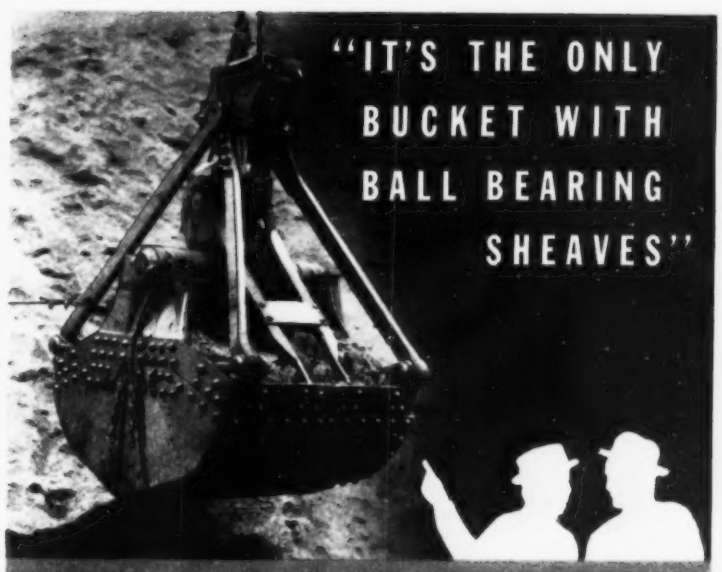
For compacting earth fills—the practical design of Blaw-Knox Sheepsfoot TAMPING ROLLERS appeals to contractors because they give uninterrupted service and meet all modern specification requirements.

The roller units are full floating, on husky frames—built for long, hard use.

Send for complete details and prices.

BLAW-KNOX DIVISION of Blaw-Knox Company
FARMERS BANK BUILDING PITTSBURGH, PENNA.

BLAW-KNOX
Sheepsfoot
TAMPING ROLLERS



Yes, sealed ball bearing sheaves keep lubrication in and dirt out, to prevent excessive wear and prolong the life of the bucket. In addition Blaw-Knox Buckets make generous use of tough alloy steels to avoid excessive dead weight and provide worthwhile savings in rehandling costs. Write Blaw-Knox today for Bulletin 1606.

18

BLAW-KNOX

BLAW-KNOX DIVISION
OF BLAW-KNOX CO.
Farmers Bank Bldg. Pittsburgh, Pa.

Digging and Rehandling
BUCKETS

SHOVEL

Here's progress that means

P&H

LED THE WAY WITH ALL THESE IMPROVEMENTS

—and more!

First to use alloy rolled steels throughout for greater strength and the elimination of dead weight.

First to turn to all welded construction which eliminates hundreds of rivets and bolts—saves many repair bills and costly delays.

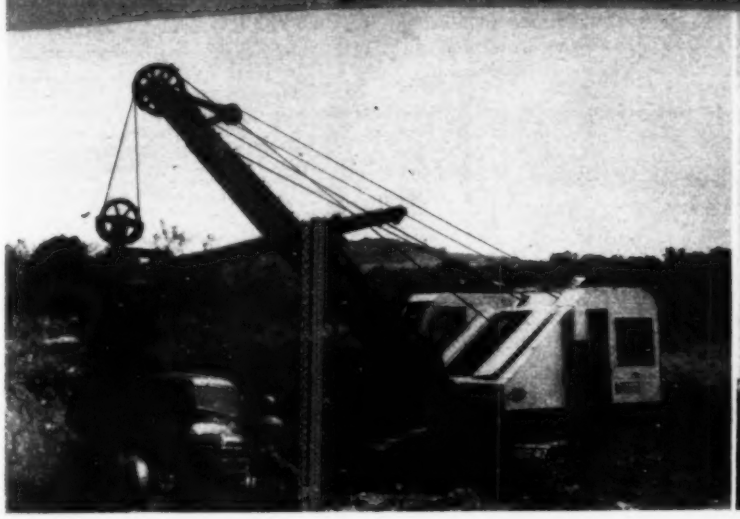
First to apply the husky Ford V-8 engine for lower operating costs on excavators of ⅜ and ½ yd. capacity.

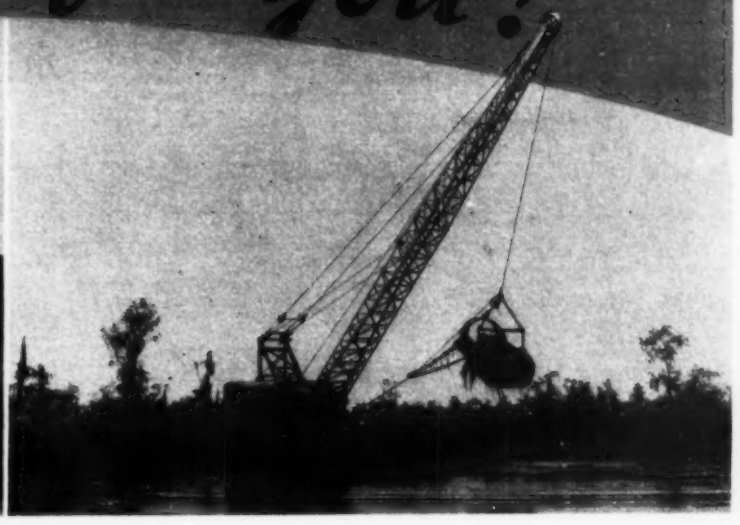
First to adopt true tractor type crawler construction—a proved money saver on thousands of jobs.

First to give you the convenience and economy of replaceable, low cost crawler shoes — removed without disturbing the crawler belt.

OWNERS:

more profits for you!





First to provide the rapid reversing planetary and chain crowd — for snappier dipper action and increased production.

First to use gasoline power on excavating equipment. First also to offer Diesel as standard power over a wide range of machines.

First to build unit welded carbody and crawler frames, all welded dippers, all welded booms — and a host of other major improvements that assure steadier profit-making on all kinds of excavating jobs.

Now P&H has other major improvements that will give you still higher production — still easier operation — still lower costs. See them at the Road Show, Booth G-7.

P&H is still five years ahead of the field.

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HARNISCHFEGER
CORPORATION

EXCAVATORS • ELECTRIC CRANES • ARC WELDERS P&H HOISTS • WELDING ELECTRODES • MOTORS

The Haiss is in the spotlight today—first choice of the men who KNOW buckets. Write or wire for prices and delivery. All sizes.

HAISS Hi-Power
FOR PAY LOAD CLAMSHELL DIGGING

In stock at New York, Philadelphia, Baltimore, Atlanta, Hartford and Los Angeles
GEORGE HAISS MFG. CO., INC., 139th ST. & CANAL PLACE, NEW YORK—DISTRIBUTORS EVERYWHERE

A Few of the *"Thousand Uses"*
for the Simplex UTIL-A-TOOL

Taking up and aligning crawler links so the pin can be readily inserted; clamping and holding booms and structural parts for welding, riveting or assembly and bending or straightening equipment parts such as on bulldozers and snow plows, are only a few of the "thousand uses" for the Simplex Util-A-Tool.

Besides these jobs, it lifts (up to 17½ tons), pushes, pulls, spreads, tensions, cutting costs and saving time for contractors, house movers and highway department shops. Frequently pays for itself on a single job. Comes complete with attachments in handy carrying case.

SOLD BY YOUR SUPPLY HOUSE.

TEMPLETON, KENLY & CO., Chicago, Ill.

Better, Safer Construction Jacks Since 1899

SIMPLEX
GOLD MEDAL AWARD SAFETY JACKS

(Continued from page 64)

joints in flat position flush with surface of plates. Smooth welds made by this electrode of particular advantage where appearance is important. Electrodes may be used either with normal or reverse polarity with a.c. or d.c. current. Made in two sizes in 18-in. lengths, ¼ and 5/16 in. and is packed in 50-lb. containers.—**Lincoln Electric Co., 12818 Coit Rd., Cleveland, Ohio**

★ ★ ★

IMPROVED DETACHABLE BUCKET EQUIPMENT called "Load Lugger" for mounting on any standard truck chassis is one-piece heavy steel plate unit, with capacity of 2-cu.yd. struck measure, electrically welded and reinforced. Load Lugger has following advantages: (1) Correct load distribution eliminates excessive strains on chassis and enables 1½-ton truck to carry fully loaded 2-cu.yd. bucket. Jack-leg device attached to rear end of frame, which adjusts itself to ground level and is operated from driver's seat, relieves truck chassis of overhanging load when bucket is being raised, making counterweights unnecessary; (2) simplified control—driver

handles all operations from cab, using one lever for controlling oil valve of hydraulic hoist and for engaging dumping hook in discharging bucket which is tripped as it is lowered over end plate, providing higher discharge and quicker spotting of load. Hoisting mechanism operated by power take-off from truck engine. Heavy-duty, double-type unit raises or lowers both bucket booms, less than 20 sec. being required for raising, dumping or lowering load. Oil pump and control valve fully inclosed in compact unit and mounted under deck plate. In carrying position bucket rests on deck between two side plates and is held in place by pair of double chains, keeping load in one position at all times.—**Brooks Equipment and Mfg. Co., Knoxville, Tenn.**

★ ★ ★

LINE MARKER known as "Traf-O-Line" for spraying paint and cutback asphalt is regulated by hand and has no pressure tank or gravity drain. Is self-propelling but can also be pushed by hand. Marks straight, curved or dash lines of any desired width

and is said to make circles or figures with ease. Designed for fast line work, quick application and easy operation. Especially useful for highway departments, cities and towns, for industrial companies in marking factory floors, for street railway companies for marking car swings and for park departments and athletic fields.—**Littleford Bros., Cincinnati, Ohio**

Order from Your Nearest Distributor as Listed Below:

IN THE UNITED STATES

"RPM" DELO:
The California Company (Montana only)
Humble Oil & Refining Company
Standard Oil Company (Indiana)
Standard Oil Company (Nebraska)
Standard Oil Company of California
Standard Oil Company of Texas
Utah Oil Refining Company

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The Carter Oil Company, Tulsa, Oklahoma
Colonial Beacon Oil Company
Standard Oil Company of Louisiana
Standard Oil Company of New Jersey
Standard Oil Company of Pennsylvania

Kyso "RPM" DELO:
Standard Oil Company (Inc. in Kentucky)

Signal "RPM" DELO:
Signal Oil Company

Sohio "RPM" DELO:
The Standard Oil Company (Ohio)

IN CANADA & NEWFOUNDLAND

Imperial "RPM" DELO:
Imperial Oil Limited

IN BRITISH COLUMBIA & ALBERTA

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THROUGHOUT THE WORLD

"RPM" DELO is available through distributors in more than 100 countries.

CASE TRACTORS are great performers—have been for 47 years. So when New "RPM" DELO comes through extensive factory tests with the verdict—

"Satisfactory for Case Tractors operating on any fuel from gasoline to tractor fuel or distillate"—This means it delivers cost-cutting, life-lengthening, profit-raising lubrication! Results of J. I. Case Company tests show: Combustion chambers free of carbon deposits—meaning cooler, smoother, sweeter-running engines! All rings free in the piston grooves. Blow-by and engine wear minimized—full-power performance assured. UNFAILING PROTECTION! LONGER ENGINE LIFE!

Profit by New "RPM" DELO in *your* equipment—in stationary, automotive, or marine service. It ends ring sticking. It's safe for *all* types of bearings.

RPM
REG. TRADE MARK
DIESEL ENGINE LUBRICATING OIL

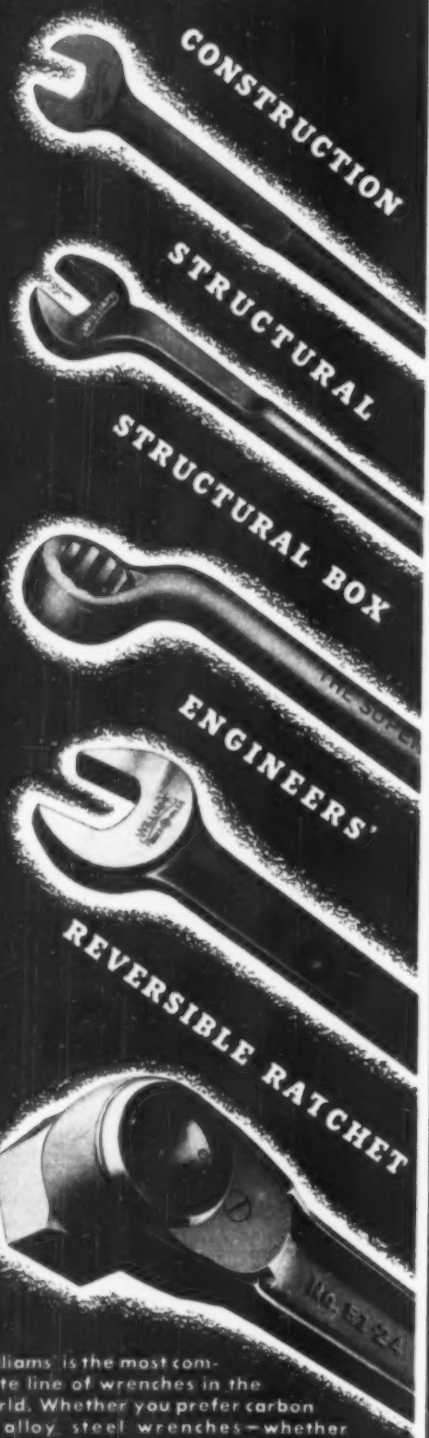
New "RPM" Diesel Engine Lubricating Oil now available everywhere in the gray barrel with the blue head

STANDARD OIL COMPANY OF CALIFORNIA

WILLIAMS

SUPERIOR DROP-FORGED TOOLS

HEADQUARTERS FOR WRENCHES



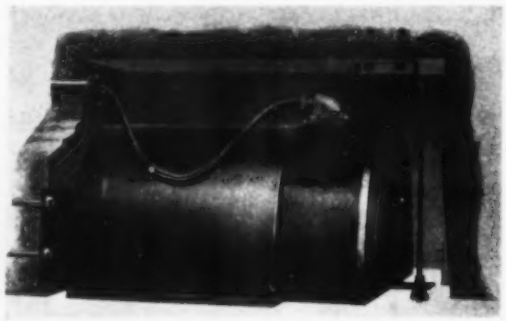
Williams is the most complete line of wrenches in the world. Whether you prefer carbon or alloy steel wrenches—whether you need Open-end, Adjustable, Box, Reversible Ratchet or Socket types you can be sure of top quality by specifying the Williams brand. Williams "Superior" Improved Carbon Steel Wrenches are just about twice as strong as old-fashion carbon wrenches . . . practically as strong as the finest alloys selling at almost double their price. Made in 50 different patterns—over 1,000 standard sizes.

J. H. WILLIAMS & CO.

225 LAFAYETTE ST., NEW YORK

Headquarters for Drop-Forged Wrenches (Carbon and Alloy), Detachable Socket Wrenches, Reversible Ratchet Wrenches, Tool Holders, "C" Clamps, Lathe Dogs, Eye Bolts, Hoist Hooks, Thumb Nuts and Screws, Chain Pipe Tongs and Vises etc.

INCLOSED SODIUM LUMINAIRE for vehicular tunnel lighting has boxed casing for permanent casting into ceilings or walls, and when installed is flush with surface. Alzak finished aluminum reflecting



surfaces in luminaire assure high utilization of sodium light output. Glass door protects these surfaces from dust and dirt. Luminaire employs 10,000-lumen sodium lamp directly connected to low-voltage multiple circuit or to high voltage series circuit through insulating transformer. Equipped with standard cathode, preheating, automatic resetting timer and radio interference suppressor.—**General Electric Co., Schenectady, N. Y.**

* * *

WELDED *Well Casing*

(Continued from page 29)

ing Equipment Co. and Lincoln Electric Co., also on the derrick floor.

The job was completed successfully without encountering any difficulties. In testing after the casing was set, pump pressure was built up to 1,200 lb. and allowed to stand for 45 min. at the close of which period the pressure had not diminished, indicating beyond all doubt that the work was a success. R. W. Kirkpatrick, division superintendent, with Glen Howard, welding foreman of the Carter company, closely inspected the work to make sure that all welds had 100 per cent penetration and a neat appearance.

* * *

Long-Boom Crane HOISTS CONCRETE FOR QUEENSBRIDGE HOUSES

(Continued from page 52)

five-ply, including a heavy core, served to complete 2,350,000 sq.ft. of slab with 126,000 sq. ft. of forms used repeatedly and supplemented in a few buildings by an additional 28,000 sq.ft. Replacements of damaged panels were necessary on about

(Continued on page 72)

B-G DITCHERS

BARBER-GREENE Ditchers are made in four different models: The Standard machine for general ditching up to 8' 3" deep and 24" wide, The Pipe-Line Special for fast cross country work, The Utility Special with the Off-Set Boom for working in close quarters, and The Service Special for easy trailer hauling, and small service jobs.

BARBER GREENE

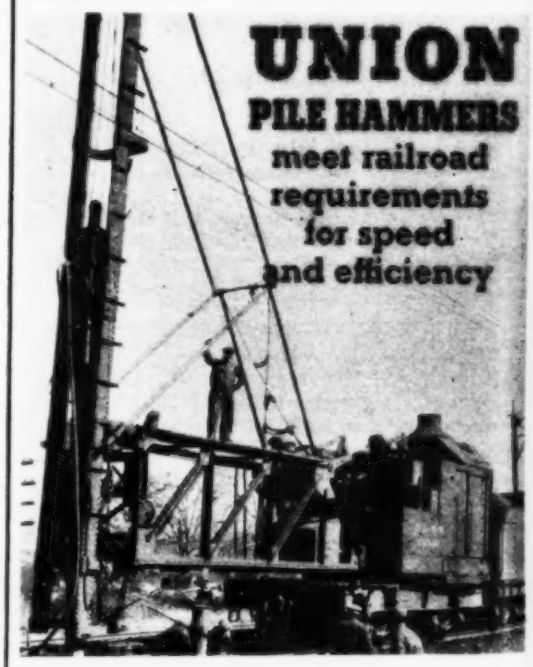
AURORA, ILLINOIS

Q-3

UNION

PILE HAMMERS

meet railroad requirements for speed and efficiency



Railroads want what YOU want — speedy, trouble-free hammer operation — that's why you find them using Union Hammers. Unions are built for driving modern long and heavy piles and that means simple, strong hammer construction. Union Hammers embody heat treated alloy steels, nickel semi-steel alloy bronzes, etc., in a design based on many years of experience. One piece frame; no bolts in moving parts; few parts; economy of steam or air consumption.

• SEND FOR BULLETINS

for full details of Pile Hammers, Union Buckets and other Union construction equipment.

UNION IRON WORKS, INC.

ENGINEERS AND MANUFACTURERS

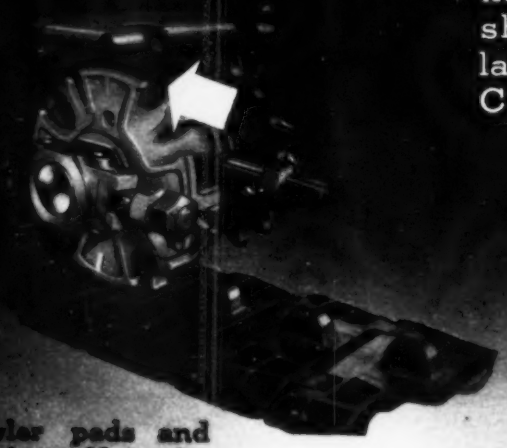
Spofford and Lidgerwood Aves., Elizabeth, N. J.

MODERNIZE *with* MARIONS

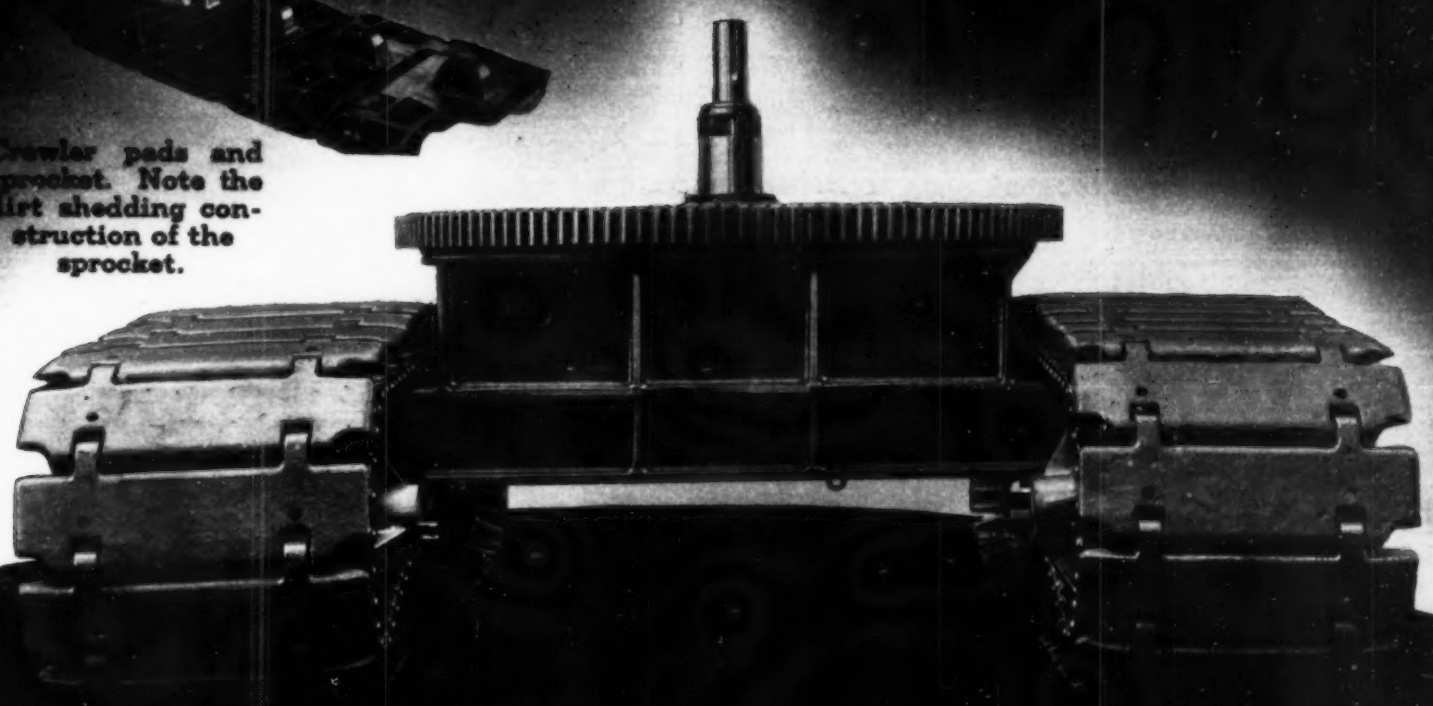
WHY DO *MARION CRAWLERS* WIN THE PRAISE OF EVERY MARION OWNER?

Every buyer of a Marion shovel, dragline, crane, clamshell or trench hoe expresses keen enthusiasm over MARION CRAWLERS. They like the way these CRAWLERS travel over uneven ground without locking or binding—how they pull through any material without clogging. They like the idea of using manganese steel for crawler shoes as this reduces the bending and breaking of belts to a minimum. • MARION CRAWLERS are built with tapered open pockets in the driving sprockets to prevent material from packing in and to make them self-cleaning. The double flanged rollers will not collect dirt. Ample clearance between the crawler belts and the bottoms of the side frames provides a dirt shedding action in travel that prevents any delay caused by clogged crawlers. • MARION CRAWLERS should be one of the determining factors in your decision to

MODERNIZE with MARION



Crawler pads and sprocket. Note the dirt shedding construction of the sprocket.



THE *MARION* STEAM SHOVEL CO.

MARION, OHIO, U. S. A.

Shovels · Draglines · Cranes · Clamshells · Trench Hoes · Walkers

Sewer — South St. Paul, Minnesota

Twelve Feet of Water

. . . in sand, clay and silt might have meant trouble. But not on this job. A MORETRENCH WELLPOINT SYSTEM dewatered the excavation overnight, enabling the contractor to proceed absolutely *in the dry — at a minimum cost — with no time lost.*

★

Dry Results are guaranteed on every Moretrench job!

★

MORETRENCH CORPORATION

90 West Street • New York

MODEL P-A PLANTS ARE BUILT IN 4 SIZES

MODEL PA-15 1500 Mixer
MODEL PA-20 2000 Mixer
MODEL PA-30 3000 Mixer
MODEL PA-40 4000 Mixer

A NEW PORTABLE ASPHALT PLANT

in completely assembled sectional units easily moved by truck or rail and quickly erected without the use of a crane or gin pole.

Patents applied for — Built in 4 Sizes

Write for Bulletin T-260

HETHERINGTON & BERNER, INC.

701-745 Kentucky Avenue — Indianapolis, Ind.

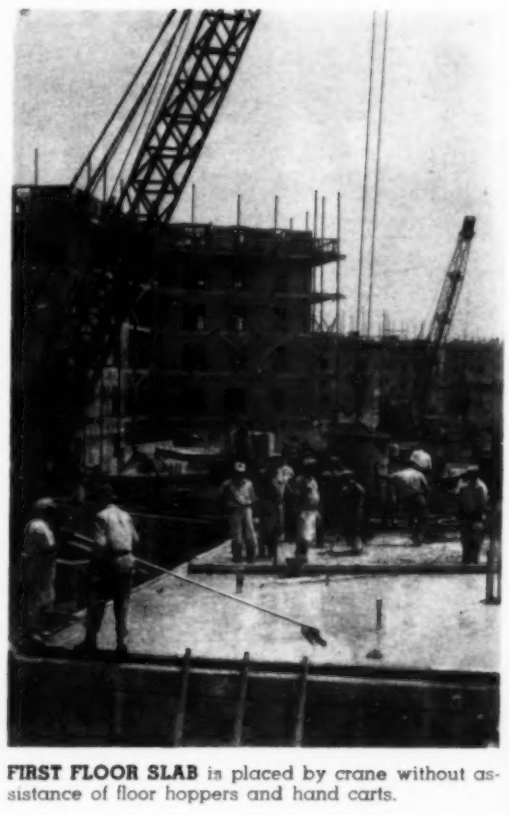
(Continued from page 70)

20 per cent of the forms used repeatedly.

Working on an expectancy of 21 uses for the heavy gum plywood, the contractor attempted to get an average of at least ten uses before turning the panels. Upon completion of the job, a large portion of the forms was serviceable for further use on ordinary concrete construction.

Ceilings in the buildings are concrete. Gum plywood left a clear ceiling surface substantially free from wood grain. After six or seven uses the panels showed some evidence of checking in the top ply.

Cranes — One crawler-mounted Speedcrane and a P&H crane on a Mack truck chassis were equipped with 85-ft. booms to handle materials and equipment to the roofs of six-story buildings which measure 52 ft. from the top of the first floor slab to the top of the roof slab.



FIRST FLOOR SLAB is placed by crane without assistance of floor hoppers and hand carts.

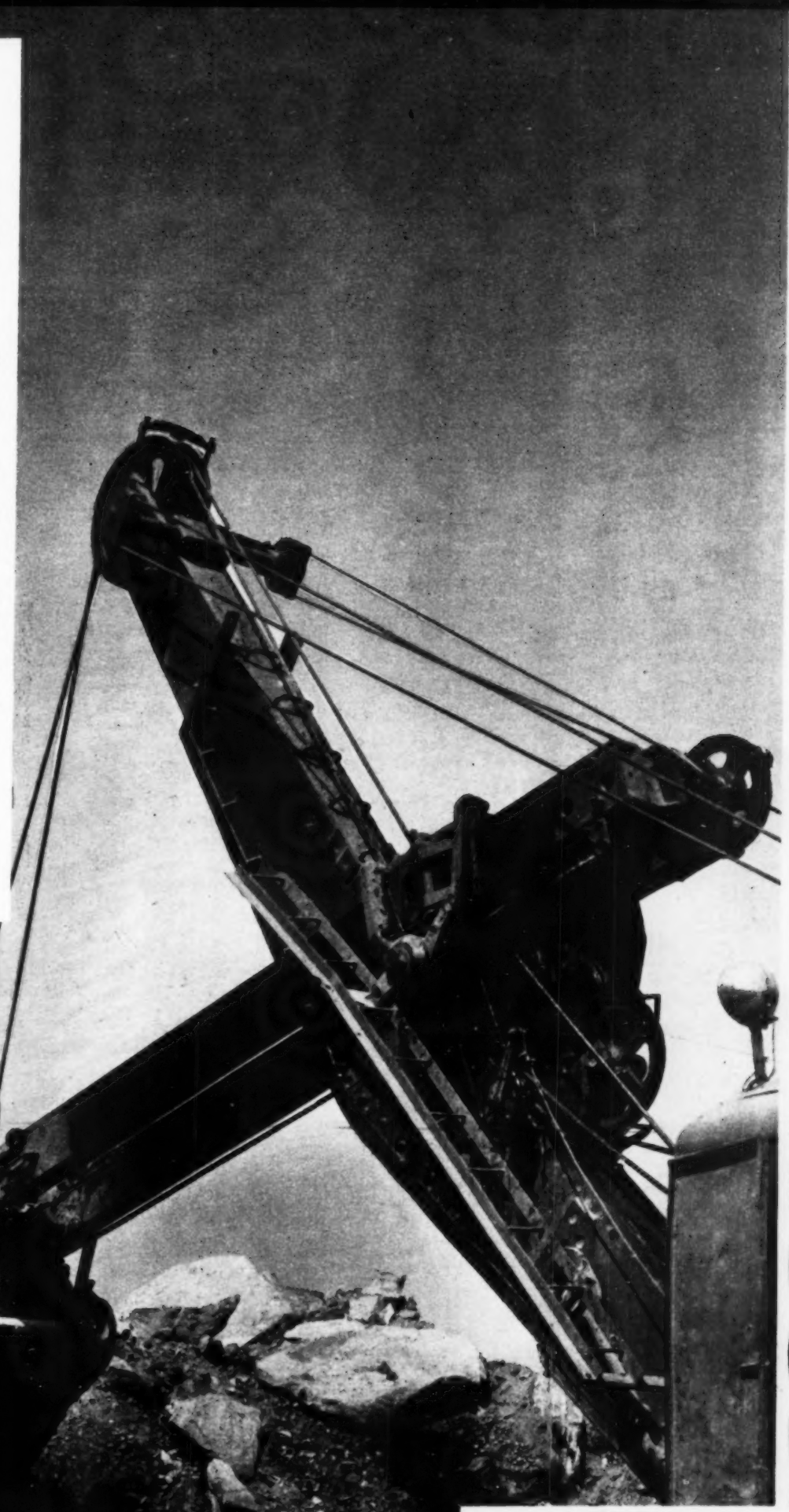
Curing Slabs—What is believed to be an innovation in curing concrete floor slabs in buildings was attempted with great success at Queensbridge Houses. After experiencing difficulty in holding ordinary sheet covers on the slabs through all kinds of wind and working conditions, the contractor turned to elastic membrane materials, applied in a liquid state by pressure sprays immediately behind the finishers, before the concrete had taken its initial set. Asphalt cutbacks and emulsions or clear transparent compounds were used for the membrane coating, as dictated by job conditions and the state of the weather. A single spray outfit was easily capable of covering 17,500 sq.ft. of slab in half a day. The spraying equipment, supplied by the Thompson Materials Corp., New York City, was the same that has been used on concrete pavement for years. Sprayed membrane curing proved simpler, cheaper

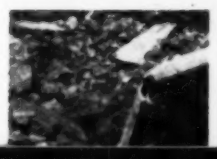
(Continued on page 74)

J&L *Precisionbilt*
WIRE ROPE HAS THE PLUS-VALUE OF CONTROLLED QUALITY STEEL AND PRECISION CONSTRUCTION

In J & L Precisionbilt Wire Rope you get all the latest developments and improvements in wire rope construction. You get a product made exclusively of J & L Controlled Quality (CQ) Steel. This means that every process of manufacture, from analysis of ore to the final drawing of rope wire, is under scientific and metallurgical control. You get a product that is exact in its construction because J & L machines were especially designed and built to make wire rope worthy of the name.

Whenever you need wire rope, buy J & L Precisionbilt. There's none better.





JONES & LAUGHLIN STEEL CORPORATION

AMERICAN IRON AND STEEL WORKS

GILMORE WIRE ROPE DIVISION

PITTSBURGH, PENNSYLVANIA

J&L STEEL

(Continued from page 72)

and more effective than the methods previously tried.

High-Early-Strength Roof Concrete — Cement for the job was furnished by the housing authority. Where a saving could be effected by earlier stripping of roof forms, permitting their removal to the first floor of a new building, the concrete contractor ordered Incor high-early-

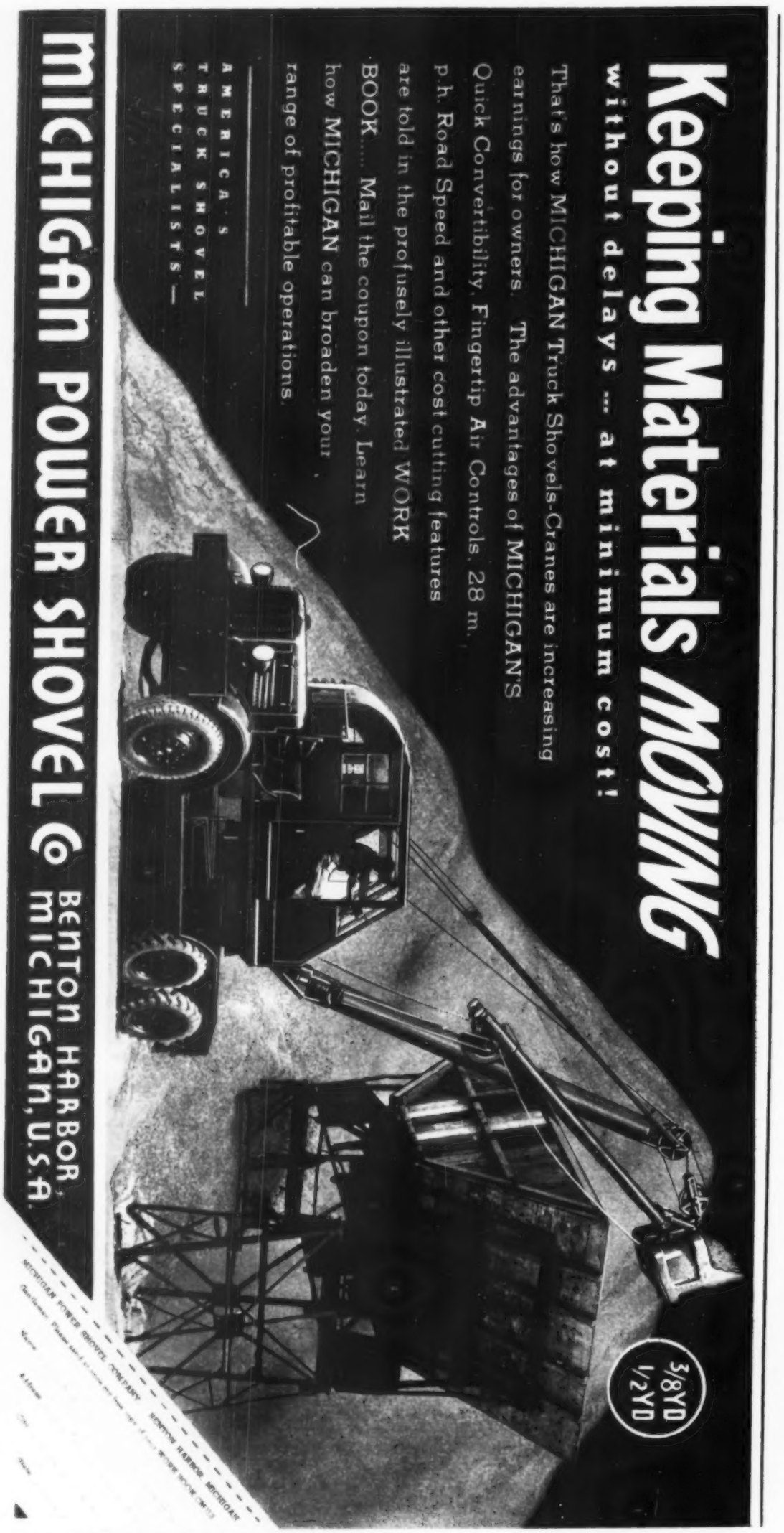
INTERIOR COLUMNS are continuous from foundation footing up to second floor level. First-floor concreting follows hard upon heels of electricians, as is case with practically all subsequent floors.

strength cement for the roof slabs. High-early-strength concrete was placed in the roof slabs of about 35 Y-units.

Foundation Contract — Under a preceding separate contract, the Corbetta Construction Co., acting as general contractor in this case, built the foundations for the 26 apartment houses and two community buildings. Most of the buildings rest on cast-in-place concrete piles installed by the Raymond Concrete Pile Co., subcontractor. Construction of the 12-in. concrete foundation walls was interesting chiefly for the use of 100,000 sq.ft. of plywood-filled 2x3-ft. steel angle Uni-Form panels and for the substitution of a more economical V-shaped channel for the drip cap originally proposed.

Administration — Until his resignation in October, Alfred Rheinstein headed the activities of the New York City Housing Authority as chairman. General management of the Authority's building program, which is being carried out under loan contracts with the U. S. Housing Authority, rests with Allan S. Harrison, secretary, and John M. Johnson, construction manager. At Queensbridge Houses, Fred Foss is project supervisor for the New York City Housing Authority, and Louis D.

(Continued on page 76)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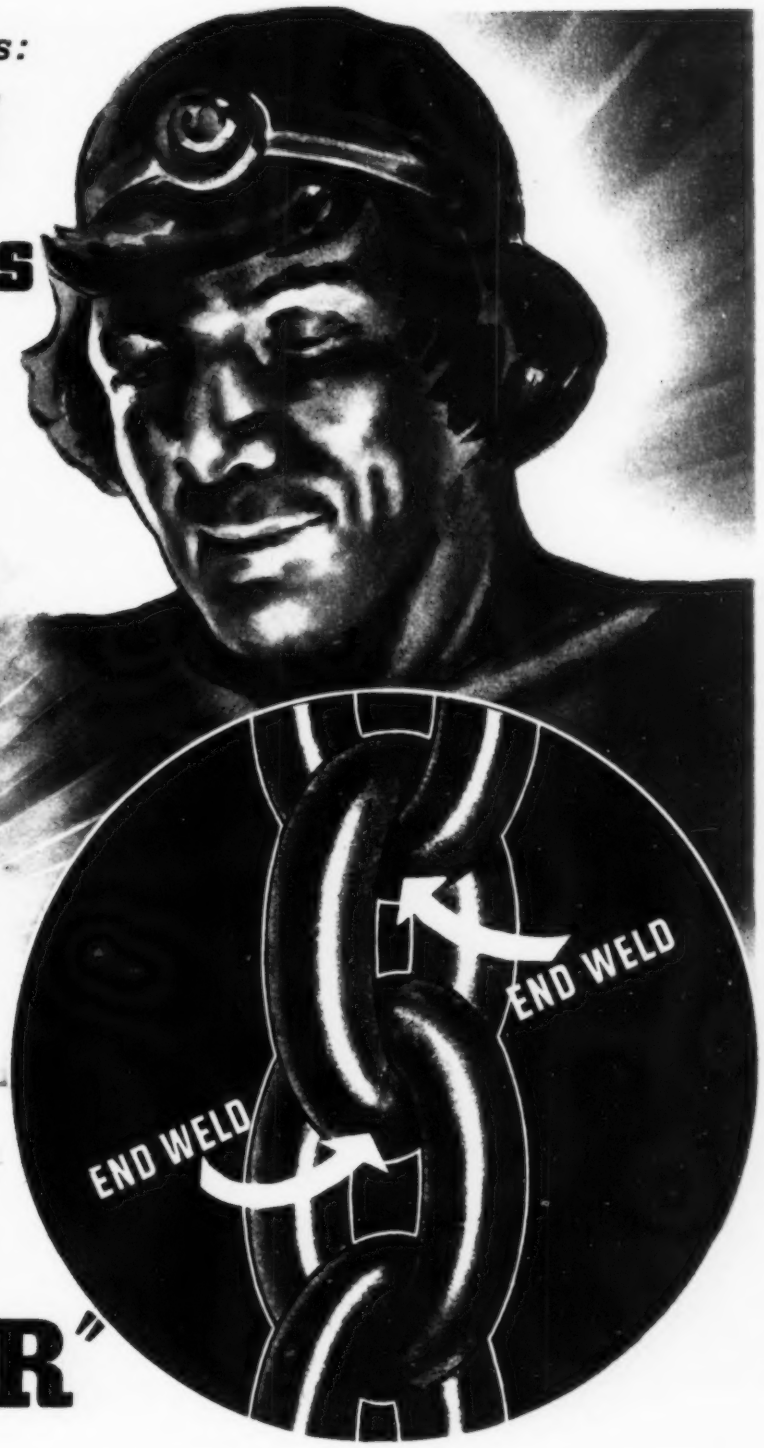
without delays ... at minimum cost!
That's how MICHIGAN Truck Shovels-Cranes are increasing earnings for owners. The advantages of MICHIGAN'S Quick Convertibility, Fingertip Air Controls, 28 m.p.h. Road Speed and other cost cutting features are told in the profusely illustrated WORK BOOK.... Mail the coupon today. Learn how MICHIGAN can broaden your range of profitable operations.
AMERICA'S TRUCK SHOVEL SPECIALISTS—
MICHIGAN POWER SHOVEL CO BENTON HARBOR, MICHIGAN, U.S.A.
3/8 YD 1/2 YD
MICHIGAN POWER SHOVEL COMPANY
BENTON HARBOR, MICHIGAN

The ACCO Chain-Maker says:

New *End-Welded* Alloy Sling Chains Deliver 4 TO 1 Longer Service



"ENDWELDUR"

● These chains endure under elevated or sub-zero temperatures, moderate impact loadings, and bending and gouging, because of the end-weld construction which protects the weld from serious abuse.

You'll find it profitable to buy Endweldur and all other types and sizes of industrial and hard-ware chain made by the American Chain & Cable Company, the world's largest manufacturer of welded and weldless chain for all purposes.

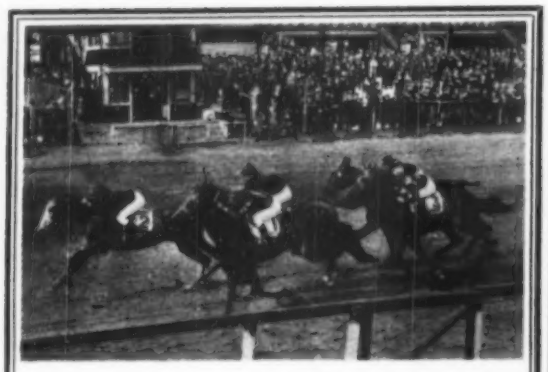
We have complete stocks—from dog chains to log chains—from tire chains to sling chains—from sash chains to anchor chains.

Write for free booklet on Registered Sling Chains—tell us your chain problems—our engineers will gladly offer practical suggestions. American Chain Division, American Chain & Cable Company, Inc., Bridgeport, Connecticut.

ACCO TRADE MARK

AMERICAN CHAIN & CABLE COMPANY, Inc.

AMERICAN CHAIN DIVISION • AMERICAN CABLE DIVISION • ANDREW C. CAMPBELL DIVISION • FORD CHAIN BLOCK DIVISION • HAZARD WIRE ROPE DIVISION • HIGHLAND IRON AND STEEL DIVISION • MANLEY MANUFACTURING DIVISION • OWEN SILENT SPRING COMPANY, INC. • PAGE STEEL AND WIRE DIVISION • READING-PRATT & CADY DIVISION • READING STEEL CASTING DIVISION • WRIGHT MANUFACTURING DIVISION • IN CANADA: DOMINION CHAIN COMPANY, LTD. • IN ENGLAND: BRITISH WIRE PRODUCTS, LTD. • THE PARSONS CHAIN COMPANY, LTD. • *In Business for Your Safety*



Underwood & Underwood News

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Like a champion thoroughbred horse, the famous Ames Shovel leads the field. Since 1774 Ames has been the favorite in Plain Back Shovels.

The outstanding feature of an "Ames" is its bend. This bend which gives a perfect balance, has often been imitated but never duplicated. The high graceful lines of this bend identify this pioneer shovel... the Shovel that built America.

Other exclusive features are: Electric welded straps, which assure a permanent... not a temporary connection; Time tested special alloy Steel, which gives longer wear; Armor-D Handles and Die Embossed Labels.

For an item that will bring home more profits, feature the Ames Plain Back Shovel.

Ask Your Jobber

AMES Since 1774

AMES BALDWIN WYOMING CO.
Parkersburg, W. Va. North Easton, Mass.

ABW PRODUCTS

Shovels • Spades • Scoops • Forks • Hoes • Rakes
Post Hole Diggers • Agricultural Handles

(Continued from page 74)

Koop, construction advisor, represents USHA.

For the Corbetta Construction Co., general contractor on foundations and concrete subcontractor on superstructures, Fred W. Narr, superintendent, directed all superstructure work at the site. Construction operations of the Cauldwell-Wingate Co., New York City, general contractor for the superstructures, are coordinated under G. J. McDonald, superintendent at Queensbridge Houses.

* * *

Jack-Knife Boom FOLDS UP FOR TRANSPORT

(Continued from page 55)

rubber-tired wheels rolls away from the machine as the boom is raised until the 32-ft. section is hanging vertically from its hinge, with the boom end rolling on the rubber-tired wheels.

As dead center is reached, an assistant pushes the 80-ft. boom point past dead center point, and the operator simultaneously lowers the 48-ft. section. The two rubber tires at the 80-ft. point roll away from the machine, straightening the boom into its full 80-ft. length. The 32-ft. and 48-ft. sections are thus in line and they are bolted together at this section.

The two boom hoist cables, which are still connected to the 48-ft. point, then are cut loose and an extra section inserted with an anchorage at the 80-ft. point. A cotter key holds the rubber-tired wheels on the axle at the 80-ft. point making them easily removable. All that remains then is for the line hoist cables to be reeved through the boom point sheave and the bottom block assembled.

Assembly a Half-Hour Task

This "jack-knifing" is a matter of about 3 to 5 min. The bolting of the couplings for the lengthening of the boom cables and the reeving of the bottom block all can be accomplished by two experienced men in about ½ hr. When folding the boom, the reverse procedure is used.

The above procedure takes the boom to the 80-ft. length. When the 110-ft. length is required, the 30-ft. jib is added by fastening the foot of the jib to the special anchorage in the 80-ft. boom head. A gantry then is fastened to the boom head and the jib head. The capacity of this crane ranges from 15 tons on a 50-ft. boom at a 10-ft. radius, to 3 tons on a 110-ft. boom at a 25-ft. radius.

Mounted on a specially constructed subbase, the truck-crane has capacity to han-

(Continued on page 78)

CMC 2 Wheel End Discharge Trailer
CMC 4 Wheel End Discharge Trailer
CMC Dual Prime Pump
CMC Pneumatic Tired Material Cart

THE MOST FOR YOUR MONEY IN EQUIPMENT!

You're RIGHT when you pick CMC. You get the latest in Mixers all sizes — engineered for highest daily output. They mix faster — move faster and are built to "take it".

SEE CMC — THEN DECIDE!

Write for catalog showing newest models of Mixers, Plaster and Mortar Mixers, Dual Prime Pumps, Hoists, Saw Rigs, Pneumatic Tired Carts and Barrows. Write today!

CONSTRUCTION MACHINERY CO.
WATERLOO, IOWA

For High or Low Pressures on Steam, Air or Liquid Lines!

"BOSS" HOSE COUPLINGS

Washer Type, Style W-16 • Ground Joint Type, Style X-34
Companion Male Coupling, Style MX-16

Among the reasons why "BOSS" Couplings lead all others in sales and variety of industries served are, first, because they provide insurance against leaks, pressure losses and shut-downs; second, because they make hose last longer by actually protecting the ends . . . the parts that are generally first to "go."

Made in sizes ¼" to 4", inclusive, with all parts steel or malleable iron, cadmium plated. Sizes 1" and larger have "BOSS" Offset Clamp . . . the ultimate in clamping efficiency.

Stocked by Leading Rubber Manufacturers and Jobbers

DIXON VALVE & COUPLING CO.

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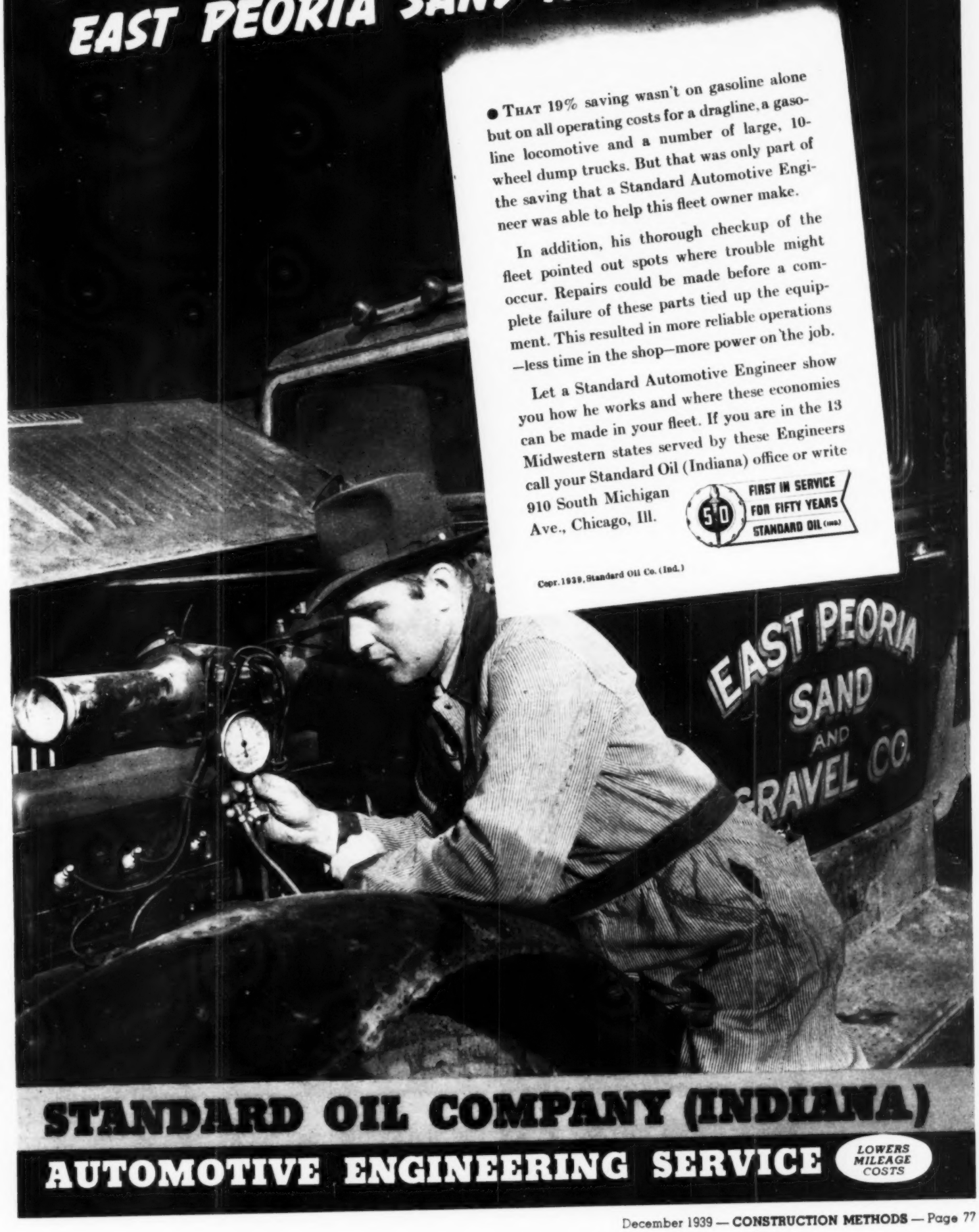
SAVES 19% FOR EAST PEORIA SAND AND GRAVEL CO.



● THAT 19% saving wasn't on gasoline alone but on all operating costs for a dragline, a gasoline locomotive and a number of large, 10-wheel dump trucks. But that was only part of the saving that a Standard Automotive Engineer was able to help this fleet owner make.

In addition, his thorough checkup of the fleet pointed out spots where trouble might occur. Repairs could be made before a complete failure of these parts tied up the equipment. This resulted in more reliable operations —less time in the shop—more power on the job.

Let a Standard Automotive Engineer show you how he works and where these economies can be made in your fleet. If you are in the 13 Midwestern states served by these Engineers call your Standard Oil (Indiana) office or write 910 South Michigan Ave., Chicago, Ill.

FIRST IN SERVICE FOR FIFTY YEARS
STANDARD OIL (IND.)

Copr. 1939, Standard Oil Co. (Ind.)

STANDARD OIL COMPANY (INDIANA)

AUTOMOTIVE ENGINEERING SERVICE LOWERS MILEAGE COSTS

check for **LOADability, HAULability**

and **BRAKEability**

Returns from your trailer investment will be governed by these three performance factors.

It must "LOAD" and "unload" easily. Be strong but light to "HAUL" with comparative ease—and be capable of reliable control and quick stopping in the face of emergencies.

You'll find the required features incorporated to the fullest degree in ROGERS Trailers.

ROGERS BROTHERS CORP.
220 Orchard St. ALBION, PA.

EXPERIENCE *built it*—**PERFORMANCE** *sold it*

INCREASE YOUR DRAGLINE YARDAGE PUT A PAGE BUCKET ON THE JOB!

Among dragline users Page Automatic buckets have a reputation of increasing yardage 15% to 30% over that obtained with other type buckets of equal size and weight.

The reason,—the patented rounded front design which forces Page buckets to use all of their weight most effectively for digging,—dig at any depth.

Get the most out of your dragline,—increase yardage and profit. Put a Page Automatic on the job! See your equipment dealer or write for additional information.

BUILT IN SIZES ¼ TO 15 CUBIC YARDS

***Dig with a* PAGE AUTOMATIC!**

PAGE ENGINEERING COMPANY
CLEARING POST OFFICE CHICAGO, ILLNOIS

(Continued from page 76)

dle long booms. The sub-base allows the machine to keep close to the ground, giving a low center of gravity and unusual stability.

Erecting 130-ft. Tower

On the Gloucester high school the last section of the 130-ft. steel tower was 20 ft. long, and since the boom was not sufficiently long to reach the top, a hitch on this section was made in the middle. When the section was hoisted to the maximum lift of the crane, this section was pivoted around its middle by means of men on the ground with guy ropes attached to the foot of the section. In this way, the foot of the section was brought into place.

Powered by a 6-cylinder Mack engine with a 7-speed transmission, the truck-crane attains speeds of 25 m.p.h. on the road. Power is applied to all four of the rear wheels, assuring perfect traction.

* * *

TACOMA NARROWS BRIDGE

(Continued from page 51)

cellular openings in the steel framework of each caisson. Some of the problems encountered in building the two main piers under the difficult conditions of extreme depth of water and high velocity of current are recorded in the following notes from Clark H. Eldridge, bridge engineer in charge of construction for the Washington Toll Bridge Authority, of which Lacey V. Murrow is chief engineer and C. E. Andrew, consulting engineer.

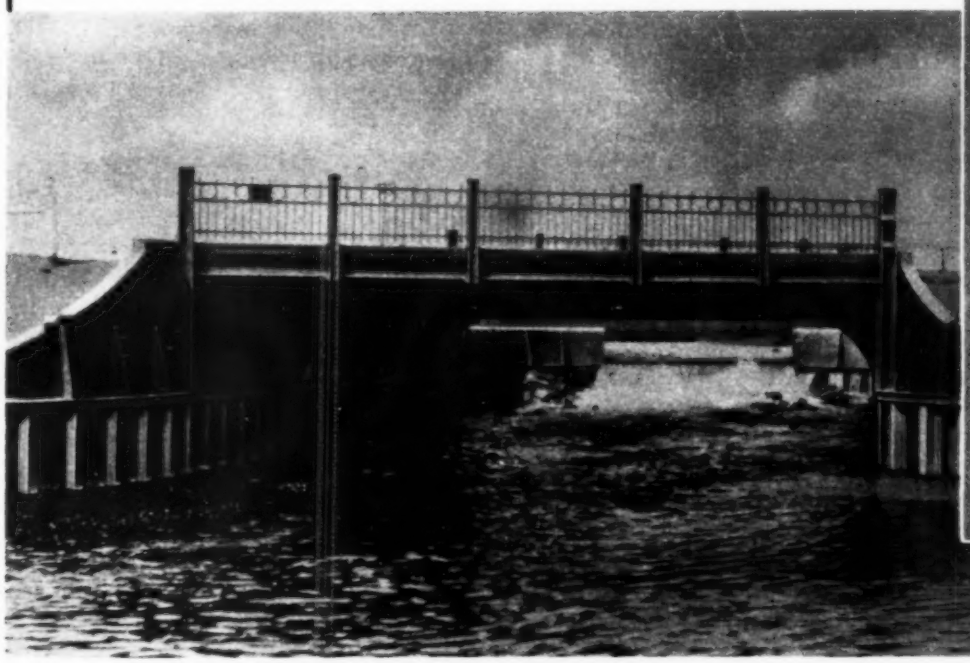
Pier 4, the west pier, was partially constructed in Seattle, and launched there March 19. Seven weeks later on May 9, after being towed to the bridge site, the cutting edge touched bottom at El. –120 Excavation with clamshells then was undertaken in order to drive the pier to the designed depth of El. –175. This phase of the work was completed on June 19. The seal, requiring approximately 5,000 cu.yd. of concrete placed by the tremie method, was completed on June 26. The elapsed time from the date of launching of the caisson to the pouring of the seal was about 14 weeks.

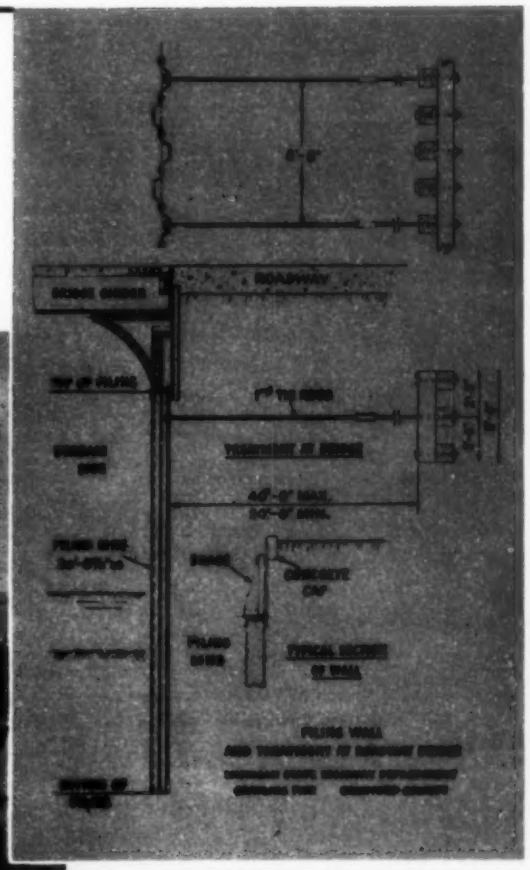
While Pier 4 was being constructed, work had also been going forward on the second main pier, known as the east, or Pier 5. This caisson was towed to position on May 15. Despite the greater tidal velocity on the east channel side of the Narrows, the Pacific-General-Columbia construction organization was determined to found this pier before the middle of June when occur the equinoctial, or extreme high tides, with their attendant

(Continued on page 80)

Here's an interesting "ALL STEEL" Bridge . . .

TWO STEEL SHEET PILING ABUTMENTS
STEEL DECK GIRDER SUPERSTRUCTURE
STEEL AND CONCRETE FLOOR
STEEL SHEET PILING SPILLWAY DAM





Designed by the Bridge Division of the Michigan State Highway Department under the supervision of Murray D. Van Wagoner, State Highway Commissioner.

General Contractor: F. C. Atlewed, Detroit

THE construction of this single span over the Au Sable River at Grayling, Mich., is clearly illustrated in the plan and cross-section above.

4475 lineal feet of U·S·S Steel Sheet Piling, Section M 116 (16″ interlock, 5″ arch, ⅜″ web and flange, 36 lbs. per lin. ft.) were used on this job.

The piles, 25′ long, were driven by No. 6, 3000 # Steam Drop Hammer, through timbers, logs, etc. on an old mill site, into sand, an average penetration of 18 ft. Depth of water 3 ft.; freeboard 3½ ft. Total length of wall 224 ft. Note particularly the all-steel construction of the abutments, with U·S·S Steel Sheet Piling under the superstructure supporting a load of 9 tons per lineal foot of wall.

Bridge floor is U·S·S Tri-Lok, a light, rugged combination steel-and-concrete floor, the forerunner of the famous U·S·S I-Beam-Lok Floor.

If you are designing bridge piers and abutments — piers, docks and wharves — bulkheads and retaining walls—beach and shore protection—lock and dam walls and cut-offs—trench walls — cofferdams for locks, dams and dry docks, more than likely you can do the job more efficiently and at lower cost with U·S·S Steel Sheet Piling. Call Carnegie-Illinois for expert cooperation.

Look for this symbol on steel products. It represents the highest quality, the finest metallurgical service.

STEEL SHEET PILING

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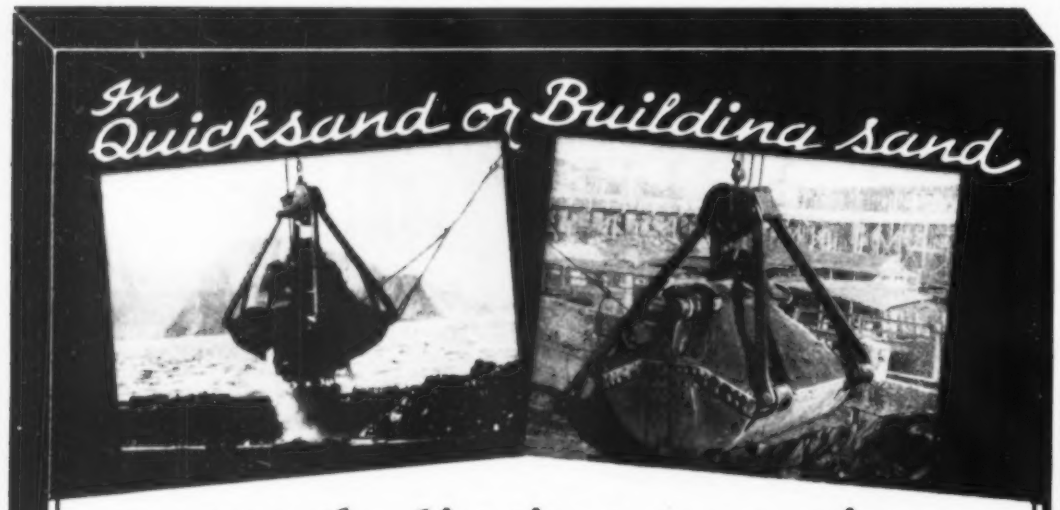
UNITED STATES STEEL



—tough digging or easier rehandling,

AN Owen Bucket will handle a greater range of work profitably than any other kind and type of bucket.

An Owen Bucket is adaptable to various digging conditions by simply changing the reeving or the amount of counterweight. It is designed for use with ingenious attachments which aid in handling difficult contracts profitably.

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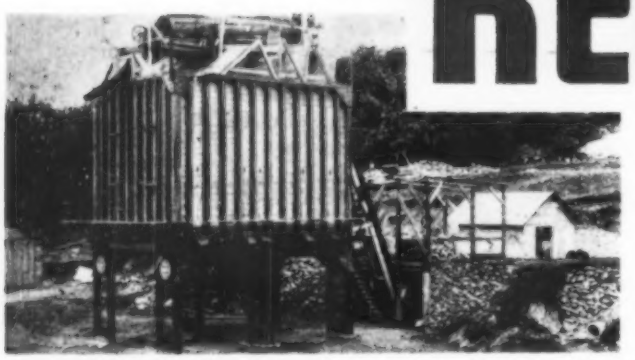
Owen Buckets Get A MOUTHFUL AT EVERY BITE

Either way—make it a **Reliance**

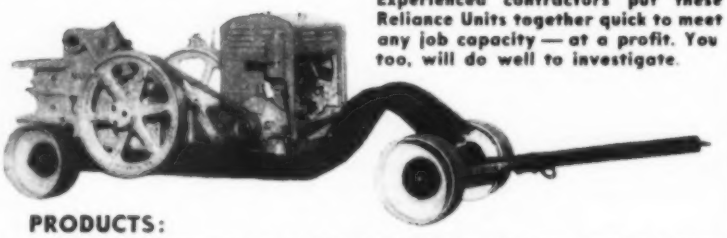


CRUSHING PLANT

A complete unit—rapidly set up, inexpensive to operate, insuring large capacity, very little vibration. Crushing, elevating, washing, screening done on spot, materials stored in Reliance Steel or Wood Bins (completely fabricated, easy to erect). Experienced contractors put these Reliance Units together quick to meet any job capacity — at a profit. You too, will do well to investigate.

PORTABLE *with* V-BELT DRIVE

Whether you use this Reliance Portable Crusher alone or in combination with an Elevator, Chute Screen, etc., you can get no better value for your money in terms of capacity, low operating cost and rugged durability. The Reliance Crusher is famous for its strength and simplicity. It is particularly stable. A "swell" buy for crushing on any job. Send for detailed circular.



PRODUCTS:
Reliance offers a complete line of Rock Crushers; Bucket Elevators; Revolving Screens; Storage Bins; Pulverizers; Chip Spreaders; Heating Kettles; Bin Gates; Feeders; Belt Conveyors; Grizzlies; Air Separators; Sand and Gravel Spreaders; Wash Boxes.

UNIVERSAL ROAD MACHINERY COMPANY
KINGSTON, N. Y., U. S. A.

DISTRIBUTORS in ALL PRINCIPAL CITIES of U. S. A.

(Continued from page 78)

minus tides which cause the waters of Puget Sound to boil through the construction of the Narrows with exceptional fury. Safety lay in landing the caisson before the tremendous force of the water was unleashed against it. Seven weeks had been required to land Pier 4 and now it was proposed to accomplish the same feat in four weeks. Could it be done? The contractors said, "Yes," and the battle was on.

Section after section of structural steel was assembled, frame on frame. Tier after tier of panelled 8x12-in. lagging was bolted and calked watertight. Concrete forms were set, stripped, raised and reset. Keeping pace, successive pours of concrete averaging 1,820 cu.yd. drove the cutting edge toward the bottom in 12-ft. plunges. The rapid pace continued 24 hr. a day, every day, without a halt until, in the early morning hours of June 9, the cutting edge rested on the bottom of the Narrows.

No time was lost in preparing to sink the caisson to a planned depth of El. —200. Bottom doors, which had served to keep the caisson afloat, were ripped out and clamshells put down to begin their ceaseless gnawing into the bottom of the Narrows. By June 19, the date of the abnormal tide runs, the caisson cutting edge was firmly set at El. —140. At the time of writing, Pier 5 has reached its final resting place at El. —224, an additional 24 ft. of depth having been decided upon after thorough investigation. The seal was placed and the work of capping the pier begun.

The elapsed time from the launching of the caisson to the pouring of the seal was 13 weeks. Pier 5 was founded at El. —224, or nearly 50 ft. deeper than Pier 4, which makes the performance outstanding.

* * *

HILLTOP EXCAVATION FOR *Pittsburgh Housing Project*

(Continued from page 41)

ment enumerated above worked on the hilltop. One or two 12-yd. scrapers were needed to distribute material discharged by the belt conveyor on the fill. At times the contractor had on the job as many as seven 12-yd. scrapers, including the tandem units, but only five scrapers of this size were in use on the day when the greatest yardage was moved. Additional tractors were required for bulldozers and for pulling a tamping roller. Two Caterpillar 97-hp. diesels and one 70-hp. diesel were equipped with Le Tourneau bulldozer

(Continued on page 82)

Are you GAMBLING with your JOB?

OFFICIALS are demanding safety surfaces on black top roads. Modern machinery should be designed to lay a finish course which will produce a safety surface. A new eastern highway was closed after three days because fats brought to the top made it slick and dangerous to traffic. Large sections of the highway had to be relaid—the rest was completely removed at great extra cost.

This can't happen on roads laid with an Adnun using properly mixed materials. Miles and miles of Adnun-laid highways have higher coefficients of friction than Portland cement. The Adnun Overlapping Cutter Bar puts down material under pressure — but without vibration. This rolls into a tightly compacted non-skid finish which is a true safety surface. *Adnuns will not tamp fats to the top.*

Don't gamble on the chance of costly resurfacing or replacement of new black top road. Get complete details on the Adnun Black Top Paver today!

THE FOOTE COMPANY, INC.
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And these other Adnun advantages mean lower cost pavement

- *Sturdy construction that endures hard service.*
- *The Power Cut-Off—no tag end runouts.*
- *Power to handle the heaviest truck.*
- *Hydraulic Controls.*
- *Overlapping action Cutter Bar—makes a perfect joint under pressure.*
- *Full adjustment for bank and wedge courses.*
- *Capacity to over 1000 tons a day.*

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TRADE MARK REGISTERED

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MULTIFOOTE CONCRETE PAVERS AND ADNUN SPREADERS

Move the Earth with BAKERS

SCRAPERS

THAT DIG AT A FLAT ANGLE

The outstanding performance of Baker Hydraulic Scrapers on all kinds of earth moving jobs proves that the flat digging angle really does mean bigger loads with less power.

Easier loading, clean dumping and even spreading make them the most practical scrapers for any job. There are many Bakers on jobs no other scrapers could profitably handle.

You can get Bakers in four sizes — 3, 5, 8 and 10 cu. yd. capacities, for tractors of 25 h.p. up.

BULLDOZERS

WITH TWIN CYLINDER OPERATION

The superiority of Baker Bulldozers and Gradebuilders is in evidence wherever tough assignments are encountered. They give tremendous down pressure to aid in digging into hard material and assure smooth, even surfaces when leveling or spreading, due to perfect blade control. They set new standards of efficiency in hydraulic operation.

With the new models now offered, there are Baker Bulldozers and Gradebuilders for practically every purpose.

Ask for latest bulletins on Baker Hydraulic Bulldozers and Gradebuilders.

THE BAKER MFG. CO.
568 Stanford Ave., Springfield, Illinois

• BAKER •

(Continued from page 80)

blades. A smaller 35-hp. diesel pulled a Le Tourneau tamping roller which compacted 6-in. loose-depth layers in the fill. All rock used in fill was broken to 6-in. maximum size. An Insley crane mounted on a truck was equipped with a skull-cracker to break oversize rock delivered to fill.

Rock rejected by a sloping grizzly over the rock bin feeding the conveyor rolled on down the bank. This oversize material was handled by a fourth power shovel which worked the 8-hr. night shift, loading tractor-drawn rockwagons. The large rock was worked into the fill.

DRAINAGE TRENCH constructed in open cut through old fill has 7-ft. slag center between 1-ft. sand envelopes. Rest of cut is backfilled with selected material, compacted.

Conveyor Bridge — As shown by an accompanying sketch, the contractor transported material from the hill to the Soho Valley fill on a Barber-Greene belt conveyor 350 ft. long supported on an 8 per cent downgrade above the hillside and the old fill by one short timber bent and six Monarch tubular steel towers, 5 ft. 10 in. by 8 ft. in plan, ranging from 18 ft. to 105 ft. in height. Spans between towers were bridged by standard angle-iron trusses supplied with the conveyor. Designed to carry 600 to 700 cu.yd. an hour, the conveyor was equipped with a Goodyear 42-in. six-ply belt about ½ in. thick chain-driven at 250 ft. per minute by a Westinghouse 30-hp. motor. At the discharge end of the conveyor, a flap gate and two spouts chuted material to either side.

About 80 per cent of 600,000 yd. of material delivered to the Soho Valley fill

(Continued on page 84)

Mall VIBRATORS *Slash Costs! Multiply Profits!*

Pneumatic wheel mounted 3 H.P. gasoline engine vibrator. Can also be used for SURFACING, PUMPING, SAWING, GRINDING and DRILLING.

Profit-wise contractors everywhere are swinging to MALL internal vibrators for every type of concrete construction. They are fast and efficient, light in weight, easily portable and stand up under hard, continuous usage. They assure a better bond with reinforcement — greater density and stronger concrete without honeycomb or aggregate pockets.

Regardless of your requirements, you'll find a gasoline engine or electric driven vibrator, ranging from 1 H.P. to 3 H.P. that will add new economy and efficiency to your construction program.

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Results mean more than words. Talk is cheap and anyone can make a lot of unproved claims. But on the job a pump must do its own talking. Try out a G & R pump and then you be the judge.

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UNSURPASSED FOR PUMP-ING FAST

AGAIN THE CONTRACTORS BOUGHT GORMAN-RUPP

On the new Shore Parkway project at Brooklyn two centrifugal pumps one an 8-inch and the other a 4-inch, clogged and quit. Two "Can't Clog" G & R 6-inch pumps replaced the quitters and for weeks pumped 24 hours per day.

Gorman-Rupp Pumps Can't Clog. They are not quitters. That's why MORE CONTRACTORS ARE STANDARDIZING ON GORMAN-RUPP PUMPS THAN ANY OTHER MAKE. They will pump MORE WATER and pump MORE HOURS at LESS COST.

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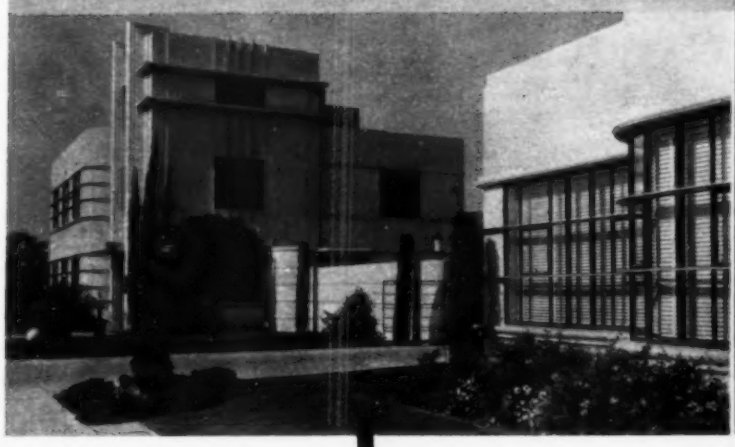
THE GORMAN-RUPP CO. Mansfield, Ohio

★ Because architect Wm. E. Mayer specified Plyform, he secured at low cost the smooth flawless surfaces responsible for the beauty of this new Lane Wells Co. building, Los Angeles.



★ Note the contrast! On this concrete wall at McChord Field Air Base, Tacoma, Wash., ordinary sheathing was used on lower part. *Plyform on upper!* Be smart! Use Plyform and save!

Specify PLYFORM *on your next job!*

Douglas Fir Plywood Concrete Form Panels are engineered for cost-cutting performance!

1. Plyform serves as sheathing and lining combined!
2. The satin-smooth surfaces of every Plyform panel are oil-treated at the mill!
3. Plyform panels are edge-sealed in distinctive silver-green and are stamped with a diamond-shaped "grade trade-mark" for easy specification!
4. In Plyform only special premium water-resistant glues are used!

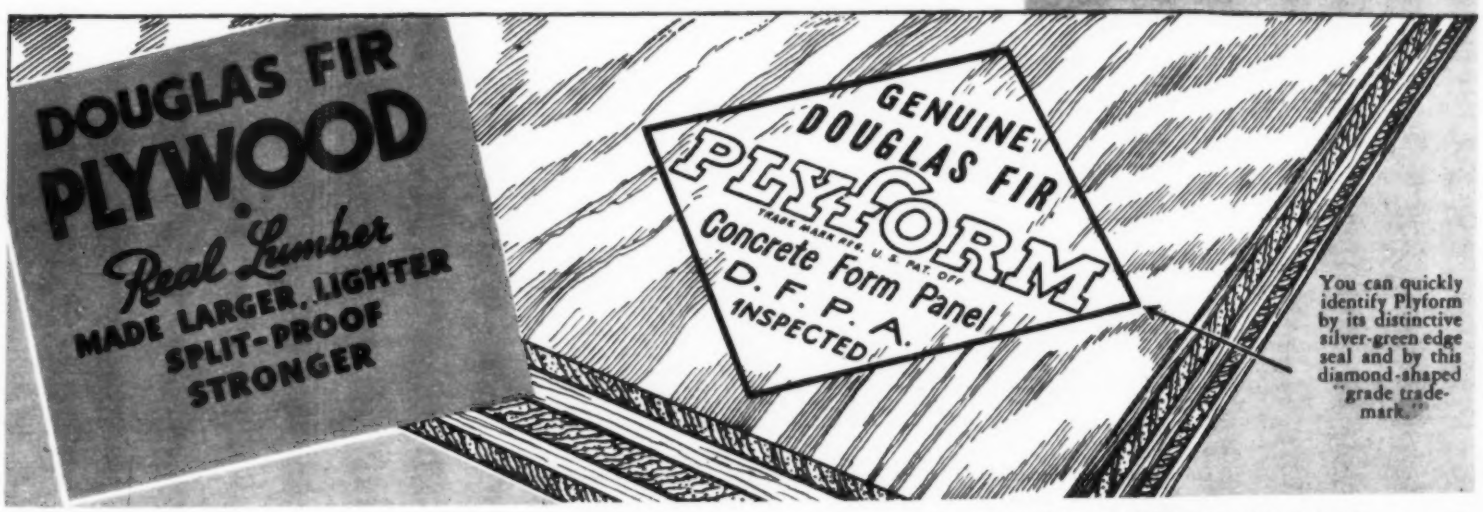
● If you want to get smoother concrete surfaces at lower cost, build your forms of Plyform. This concrete form grade of Douglas Fir Plywood minimizes joints and fins . . . cuts costs of rubbing labor as much as 12c a square foot.

Plyform panels are strong and rigid, yet light in weight. They are easily and quickly worked . . . can be nailed without boring holes.

If handled properly, Plyform panels give numerous re-uses. The simple care outlined in the column at right will repay you many times. For more information, see any recognized lumber dealer or write for technical booklet. Douglas Fir Plywood Association, Tacoma, Wash.

How to get maximum re-use from Plyform

1. Plyform is quality material, oiled and edge-sealed at the mill—TREAT IT PROPERLY.
2. Protect Plyform from the weather—both dampness and hot sun.
3. Use wooden wedges rather than pinch bars in stripping.
4. Lower carefully from high places—don't drop on edges or permit careless handling.
5. Clean panels thoroughly after each use.
6. Stack flat on dry, level platforms, using stickers to permit normal drying.
7. Re-oil before each pouring. A standard wood form oil or pale oil is generally preferred.
8. Don't swab on too much oil—just enough so that surface feels greasy to touch.
9. All newly cut edges should be sealed or doped with lead and oil or aluminum primer.
10. The slight extra cost of extra care will repay you many times over in added re-uses.



You can quickly identify Plyform by its distinctive silver-green edge seal and by this diamond-shaped "grade trade-mark."

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It is often practicable to use Primacord-Bickford Detonating Fuse in comparatively small blasts, especially in connecting Jackhammer holes. The ease of making each hook-up, and the fact that Primacord is insensitive to ordinary shock, has greatly increased the use of this method in the shooting of shallow holes.

For the giant blast, Primacord offers new advantages: a faster and more powerful detonating wave; lighter weight; easier handling and use; lower costs.

Send for the Primacord booklet. It suggests new ways to better output and profit in blasting.

THE ENSIGN-BICKFORD COMPANY
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PRIMACORD-BICKFORD
Detonating Fuse

PB15

IN CLOSE PROXIMITY to Pittsburgh's Golden Triangle, indicated by tall buildings in background, Pittsburgh Housing Authority grades rugged terrain of Hill District to place low-rent housing on three levels of Terrace Village No. 1. Lower slope of Soho Valley fill, being built up to total depth of 180 ft., appears in right foreground.

(Continued from page 82)

passed over the belt. A major problem was involved in designing satisfactory feeding hoppers by which various types of hauling equipment could transfer loads of earth and rock to the conveyor. The sketch and several photographs show how the contractor's engineer met this problem.

Separate timber hoppers were constructed below grade to handle earth and rock. From these hoppers 42-in. pan-type steel belt feeders 12 ft. long, individually driven by 15-hp. Westinghouse motors, delivered the two classes of material to the main conveyor, the earth load reaching the conveyor first to cushion the rock. Below the rock bin, a secondary hopper broke the fall of rock dropped from the feeder to the conveyor.

Scrapers delivered their loads to the earth hopper, the unloading of these units being facilitated by their positive ejection feature. An ingenious arrangement of hoist-controlled sliding gates enabled scrapers or trucks to pull directly across the hopper before and after dumping. As the illustrations show, the gates could be closed to permit spotting of equipment and then opened to receive the dumped load. A Mead-Morrison double-drum electric hoist operated by a G.E. 20-hp. reversing-type slip-ring motor worked the two gates on continuous lines wrapped around the two drums.

To take care of oversize rock, the rock hopper was installed next to the bank and was equipped with a sloping grizzly which passed the large pieces down the hill. In spite of this protection, measured slabs as long as 6 ft. 4 in. sometimes got through the grizzly and traveled out the main conveyor. Sideboards were placed on both sides of the belt to reduce spillage, and workmen operating under the conveyor were required to wear Skullgards. The hard hats prevented several accidents and saved the life of one tractor operator when a 4-lb. rock dropped 75 ft. on his head, opening a small crack in the tough helmet without even stunning the man.

Administration — For the Pittsburgh Housing Authority, functioning under the supervision of the U. S. Housing Authority, which lends the money for the projects, Dr. B. J. Hovde is administrator, and C. A. Powell is construction supervisor, with R. S. Neff as assistant construction supervisor on Terrace Village No. 1. Marlier, Lee, Boyd & Prack, Pittsburgh, are the

(Continued on page 86)

LIKE A WAR-TORN BATTLEFIELD in Europe is this grading scene on Ruch's Hill, Pittsburgh, as power shovels and tractor-scraper units dig into burning coal seam and dusty residue to level hilltop for Terrace Village housing project.

LOOK OUT! WHEN YOU PLACE CONCRETE BELOW 50° FAHRENHEIT

Calcium Chloride used in concrete in Canton, Ohio, Stadium shown above

CONCRETE SLOWS UP IN COLD WEATHER

IT takes a standard portland cement concrete mix about 12 days to attain a flexural strength of 400 lbs. per square inch at 40° Fahrenheit, while the same mix at 70° reaches the same strength in less than four days. Even high early strength mixes placed at 40° take nearly eight days to acquire safe strength.

Yet, if calcium chloride is included in either standard portland or high early strength mixes, equal strengths are acquired in about half that time.

Calcium Chloride used in Canton, Ohio, Stadium

Just as Federal Housing projects have been pushed through the winter under specifications calling for calcium chloride in concrete poured below 50°, so also the builders of this fine Canton, Ohio, Stadium utilized calcium chloride to get acceleration of set and high early strength in cold weather.

No matter whether you make concrete blocks or build great structures, remember this—that the use of calcium chloride gets concrete out of danger quickly. It shortens the time when protective measures are needed. It increases workability and density. It reduces volume changes. Finally, it increases the ultimate strength by from 7 to 12%.

Write for latest research data and suggested methods of using calcium chloride in all cold weather concreting.

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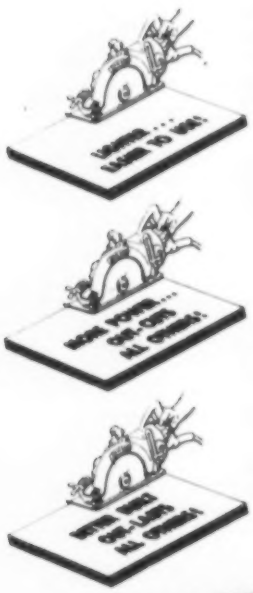
YEAR 'ROUND CONCRETE CONSTRUCTION

You may seldom need circular cuts —but when you do, SKILSAW can *make them* quicker and more conveniently than by any other method! That's because SKILSAW has plenty of torque and extra power to permit fast cutting against the added resistance of a curved line.

No other saw can give you all the cost-cutting, profit-making features of the Modern SKILSAW—developed through 19 years of constant improvement. It is lighter, better balanced, more powerful, will do more sawing jobs. Cuts wood, metal, stone and compositions. Works from any light socket. 9 POWERFUL SIZES.



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Sold by leading distributors of mine, mill, hardware and contractors' supplies.

(Continued from page 84)

architects, represented at the site by J. B. Kelly, Jr., and E. A. Schaedler.

Operations of the Harrison Construction Co., Pittsburgh, contractor, are under the direction of E. J. Harrison, president, and M. C. Harrison, vice-president. For the grading job at Ruch's Hill, Martin W, Wise was general superintendent, with Curtis

OVERALL DEPTH approaching 13 ft. in two coal seams is indicated by E. A. SCHAEDLER, architects' representative on job, who stands in front of mine tunnel formerly used to take out lower vein, about 8 ft. 8 in. thick.

Hart as superintendent on one shift and Vero Truzzie on the second. John P. Frazier, contractor's engineer, designed the conveyor bridge and loading hoppers, and Russell Boyer was field engineer at the site. Anthony Magnifesto is master mechanic.

★ ★ ★

AIRPORT RUNWAYS

(Continued from page 59)

by a tractor. As soon as the roller feet "walked out" one half the depth of the base course, the roller was filled with water and its use continued until it again "walked out" one half the depth. The use of this roller is, in our opinion, one of the most important factors in this type of construction for the following reasons: first, it aided in drying out the base course by thoroughly aerating it, and second, it compacted the base course from the bottom up instead of from the top down as other rollers do.

The top half of the base course was com-

(Continued on page 88)

BARBER-GREENE Bituminous MIXER

ACCURATE Proportioning, Thorough Mixing, High Capacity, and Versatility are simply the A, B, C of the Barber-Greene Bituminous Mixer. You should know its many outstanding advantages. Write for catalog. There is no obligation.

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This test CHANGED chain design

This destruction test, pictured above, made during 1934, opened new fields for applications of long pitch chains, where maintained accuracy is vital in transmitting power. The properties of Nickel alloy steels, with their high strength/weight ratio, permitted modern redesigning which cut weight — and costs — over heavier chains formerly forged from plain carbon steel. This 10″ link showed an ultimate strength of 455,000 lbs., a yield point of 388,000 lbs. — 30% higher than U. S. Engineer specifications.

Roller chains, with 12¼″ pitch, control roller gates on Mississippi River Dam 14, LeClaire, Iowa. Link-Belt Company used Nickel alloy steels to specifications of U. S. Engineer Office. Side bars are SAE 3140, Brinell 300-341, rollers SAE-3140, 300-341 Brinell, and pins SAE 3245, 340-380 Brinell. Triple width assemblies have an estimated ultimate strength of 2,250,000 lbs.

Dams on the upper Mississippi control water levels to provide navigable channels and guard against sudden floods. Dam gates are moved by roller chains of Nickel alloy steels. On hard jobs you can safeguard performance, keep costs down, by specifying Nickel alloy steels for all highly stressed units.

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(Continued from page 86)

pacted by means of a rubber-tired roller pulled with a tractor. This roller provided a kneading action very beneficial to the stabilized mixture.

Blade-graders and a Gledhill leveler were used to bring the surface to crown and grade. The rubber-tired roller was attached to the rear of the blader doing this work. The material that was cut off the high spots was deposited into the depressions and thus compacted. When weather conditions were such as to cause too rapid drying, a street flusher was used to moisten the base and keep the top plastic enough to work.

The usual type of 10-ton tandem roller was used for the final rolling of the base. A prime coat of asphalt emulsion then was applied by a distributor and the base left to cure and dry out ready for the wearing course.

Prime Coat

By the time the base was ready for priming, a light coating of dust had formed which made it very difficult to apply the primer evenly. Because of the large areas involved we did not want to remove this dust by sweeping. After a little experimenting, a method was developed which procured an even application of the prime coat without removing the dust. The dust was thoroughly sprinkled and then broomed with a drag-broom just ahead of the distributor. Of course, one reason that this method worked satisfactorily was that the priming material was an emulsion capable of mixing with water.

Surface Course

The wearing course was composed of a mixture of crushed gravel, concrete sand, 200-mesh dust, and asphalt emulsion. For about one-third of the total area, this top material was pre-mixed in a stationary plant set up at the railroad siding and trucked to the runway where it was spread by hand rakers. The balance of the top material was spread out in windrows on top of the completed base course and then mixed by the same traveling machine that mixed the base. In this case the spreading was done by bladers. All of the top course was rolled by 10-ton tandem rollers.

Upon completion of the wearing course, all runways were given a light seal coat of quick breaking emulsion and limestone chips. The color of this final chip coat greatly improved the visibility of the runways from the air.

Throughout the entire course of the work frequent tests were made for absorption and stability and all results were well above the minimum requirements set forth in the specifications.

Supervision

The WPA forces were under the supervision of Fred L. Roose, Director of District No. 5 and William M. Brown, WPA superintendent. The City of Akron was represented by W. F. Peters, Director of Public Service, G. E. Soderberg, Highway Engineer and by the writer who was engineer in charge of construction operations.

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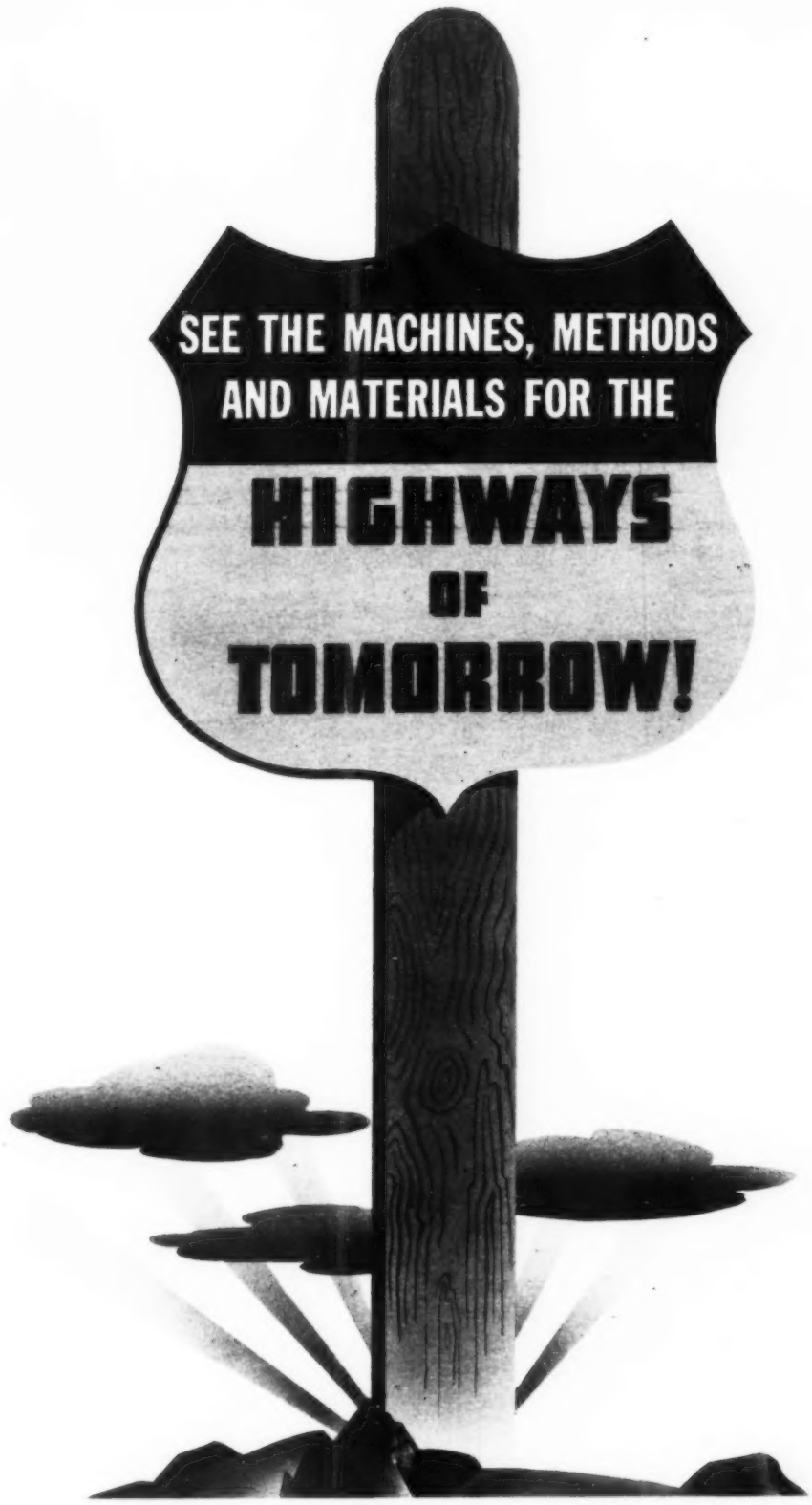

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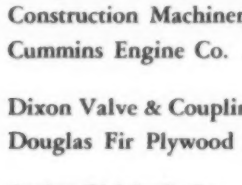
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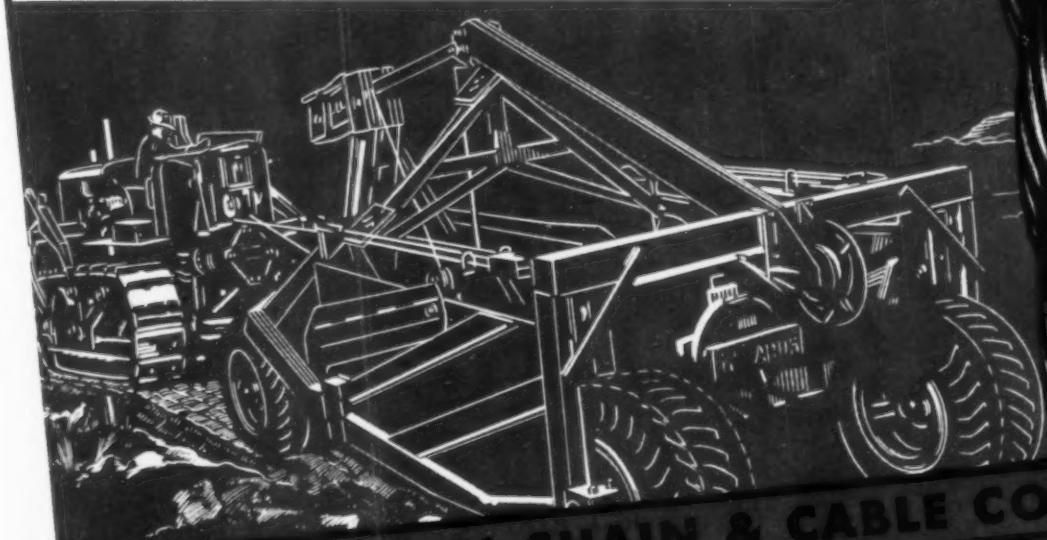

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